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DEVOTED TO THE INTERESTS OF

CONCHOLOGISTS.

VOL. VI.

MAY 1892 to APRIL 1893.

PHILADELPHIA:

Published by H. A. PILSBRY and C. W. JOHNSON.

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TO

THE NAUTILUS, VOL. VI.

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ASSOCIATE EDITOR:
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THE NAUTILUS.

VOL. VI. MAY, 1892. No. 1.

PATULA STRIGOSA GOULD, IN ARIZONA.

BY ROBERT E. C. STEARNS, WASHINGTON, D. C.

The National Museum has recently received from Mr. Marcus Baker, of the U. S. Geological Survey, numerous specimens (Mus. no. 123,576) of the above snail shell collected by him at Coon Mountain, in Arizona. From Mr. Baker I have learned the following: "Coon Mountain, from which these shells came, is a name locally applied to a possible volcanic crater, situated some ten miles south of Canyon Diablo, Arizona. It is near lat. 35° N., long. 111° W. The crater is some 500 or 600 feet deep, ranging from 5200 feet above sea level at the bottom, to 5700 feet at the crest of the rim. Within the crater is bedded sandstone, limestone (Aubrey) and talus slope. The region is excessively arid. The dead shells are found scattered along the interior slopes of the crater, more especially on the south side. Almost all are dead. I think I found a single living one, in the course of a week's working about, in this vicinity. I do not remember finding any outside of the rim. Many of the specimens were fresh, most of them dead and bleached."

Compared with examples from more northerly regions where this form abounds, and exhibits, as is well-known, extraordinary variability, these Coon Mountain specimens are rather under size or dwarfed. They are also rather flat than elevated, and some of them are more or less angulated at the periphery. The fresher examples are slightly rufous, with two narrow revolving bands on the body whorl.

This species has heretofore been found, I believe, in New Mexico. Mr. Baker's collection carries it farther to the south than before reported.

PRELIMINARY LIST OF NORTH AMERICAN PUPIDÆ. (NORTH OF MEXICO.)

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

It will take several years more before we can attempt a revision and approximately complete a list of this most interesting group of our land mollusca. The past few years have brought us a good number of new forms, and yet we have to expect, not only more such but also a more extensive knowledge of their geographic distribution and local variations. Strange as it may appear, the specimens extant in the many museums and private collections I have examined, represent only a very limited part of our country. There are areas of 100,000 square miles from which none of these minute denizens are known, or only a few from single spots. Very little, in some places nothing, has been collected in the South Atlantic and Gulf States, excepting Florida and Texas; in Kentucky, Wisconsin, Minnesota, the Dakotas, Wyoming, Idaho, Oregon; some more, but still very insufficiently, in a part of the New England States, Pennsylvania, except the southeastern region, Michigan, Maryland, Tennessee, Arkansas up to Iowa and Nebraska, Montana, Washington, Colorado, New Mexico, Arizona, Nevada, not to speak of British North America, a part of whose regions are, however, better known in this regard than some of the oldest states of the Union. Comparatively, most has been done in Maine, Massachusetts, New York, Ohio, Florida, parts of Texas, and California; sufficient to give us a fair knowledge of the distribution of not even a majority of the species, in any one State!

It appears, therefore, advisable to give a preliminary list of the species and forms described and cited as from our continent. In many instances it is impossible, as yet, to say whether a certain form is to be considered a *species* or a *variety*, for want of sufficient material; and future critics will have to decide. In all such cases I prefer, here, leaving the question open, and simply filing the names, and giving localities representing areas of distribution.

There are two groups whose members deserve our special attention and study; that of *P. muscorum* L. and that of *Vertigo decora* Gld. and their allies, and especially of these, any specimens from known localities will be of much value.

A number of forms must be added here, not yet published, as known only from one or few specimens each, most of them, in all probability, being good species. But it must be borne in mind that varieties and local forms very often are of a higher interest than new species for systematic zoology and zoogeography.

The present article has, consequently, two aims: first, to show what is known, at present, of species and varieties and their distribution; second, to point out those parts of the continent where collecting and as far as possible strenuous and careful search is most needed. Any conchologist who has a chance of visiting parts of those "blanks" will be sure to do good work, especially by using expedient methods of collecting: sifting from dead leaves, moss, grass; brushing off rocks, stones, logs, stumps, pieces of bark, old chips, etc. Fine sifted drift on rivers, brooks, etc., should be carefully gathered wherever possible, and the results will, almost everywhere, be richer than expected, not only in Pupidæ but also in Hyalina and other small and minute land shells.

I am indebted to Messrs. H. A. Pilsbry, Edw. S. Morse, Theo. D. A. Cockerell, Henry Hemphill and many other fellow-malacologists all over the country for kindly sending me specimens and valuable notes; to all of them my hearty thanks.

A few notes will be found at the end of the list.

Strobila Mse.[1]

Str. hubbardi Brown. Gulf States.
Str. labyrinthica Say. Eastern Prov.

Pupa Drap.

Subg. Pupilla Leach.

P. muscorum L. (type). Northeastern U. S.
var. ——? Nevada.
P. blandi Mse. Rocky Mountains.
P. signata Mouss. Rocky Mountains.
hebes Anc. Rocky Mountains.
sublubrica Anc. Rocky Mountains.

P. sterri Voith. (?) Rocky Mountains.
P. sp. Rocky Mountains.
P. sterkiana Pilsb. South (and Lower) California.
P. syngenes Pilsb.[2] Arizona.

Subg. Leucochila Alb. & Mart.

P. fallax Say. All east and S. W. to Arizona.
P. modica Gld. Ga., Fla.

Subg. Columella Mart. (Edentulina Cless.).

P. edentula Drp.[3] (simplex Gld.). All N. A. except southwest.
v. alticola Ing. Rocky Mts.
var. ——. Wash., Alaska.

Subg. Bifidaria Sterki.[4]
Sect. ———.

P. arizonensis (Gabb) W. G. B. Colo., N. M., Ariz.
v. saxicola Ckll. Colo.
P. corticaria Say. E. of Rockies, except extreme south.

Sect. Albinula Sterki.

P. armifera Say. All N. A.
P. contracta Say. All N. A. East of Rockies.
P. holzingeri Sterki. Ohio to Manitoba, N. M., Kas.
v. fordiana Sterki. Kas.

Sect. Bifidaria s. str.

P. hordeacea Gabb. Tex. to Ariz.
P. procera Gld. R. I. to Minn., S. C. to Tex.
P. hordeacella Pilsb. Fla. to Ariz.
P. rupicola Say. S. C. and Fla to La.
P. servilis Gld. La. ?
P. (riograndensis Sterki mss.). Hidalgo, Tex.

Sect. Vertigopsis Ckll. mss.

P. pilsbryana Sterki. N. M., Ariz.
P. curvidens Gld.[5] All N. A. east of Rockies.
v. gracilis Sterki. R. I., Ohio, Tenn.
v. floridana Dall. Fla.
P. pentodon Say. All N. A. east of Rockies.

Subg. Isthmia Gray.[6]

P. calamitosa Pilsb. South (and Lower) Cal.
P. hemphilli Sterki. South (and Lower) Cal.
P. clementina Sterki. San Clemente Id., Cal.

Subg. Angustula Sterki.[7]

P. milium Gld. All eastern N. A.

Subg. ———.

P. dalliana Sterki. Lake Co., Cal.

VERTIGO Müll.[8]

Subg. ———.

V. variolosa Gld. Fla.
V. sp. San Diego, Cal.

Subg. Nearctula Sterki.

V. californica Row., type. Cal. (near San Francisco).
  var. elongata Sterki. San Clemente Id.
  var. catalinaria Sterki. San Clem. and Catalina Ids.
  var. diegoensis Sterki. San Diego.
  var. trinotata Sterki. Monterey.
  var. cyclops Sterki. Placer Co.
V. rowelli Newc. Cal.
V. decora Gld. North.
V. corpulenta Mse. Rocky Mountains.
V. castanea Sterki. Lake Co., Cal.
V. borealis Mor. Alaska.
V. ingersolli Anc. (californica Ing.). Colo.
  var. haydeni Anc. Cunningham Gulch.
  var. accedens Anc.
V. coloradensis Ckll. Colo.
V. hoppei Moell. Greenland, Anticosti.
V. columbiana Sterki mss. Wash., different places.
  var. utahensis Sterki mss. Utah.

Subg. Vertigo s. str.

V. binneyana Sterki. Manitoba to N. M.
V. pygmæa Drp. Northeast.
  var. callosa Sterki. Ohio.

V. rugosula Sterki. South Atlantic and Gulf coasts, Cal.
var. ovulum Sterki.[9] Fla.
V. ovata Say. All N. A.
V. ventricosa Mse. Northeast to Ohio.
V. gouldii Binn. Northeast to Mont.
approximans Sterki. Ill.
V. bollesiana Mse. Maine to Ind., Va. and Tenn. (also West Indies.
var. arthuri v. Mart. ?
V. sp. Tex.
V. sp. N. Mex.
V. tridentata Wolf. Me. to Ohio and Minn.
parvula Sterki. Ohio.
V. oscariana Sterki. Fla., Tex., Tenn.

Holospira Alb. & Mart.

H. roemeri Pfr. Tex. (Mex.).
var. minor Ckll. mss.
H. goldfussi Mke. Tex. (Mex.).
H. arizonensis Stearns. Ariz.

Strophia Alb.

Str. incana Binn. S. Fla.

* * *

Pupa krausseana Reinh. ?
Vert. arctica Wall. ?

1. The proposition to place Strobila under Pupidæ will hardly meet with much opposition; it seems to be its nearest natural position. The soft parts agree with those of Pupidæ, and so does the shell, except its more depressed form which, however, can be no objection if we compare it with Hypselostoma, etc. Acanthinula, too, we might range here, as also Morse did,* for the American species.

2. This species is evidently related to *P. australis* Ad. & Ang.

3. There are, among the common low form, high specimens with narrower penultimate and wider last whorl, found everywhere occasionally in this country as well as in Europe; and thus *P. alti-*

* Pulmonifera of Maine, p. 32.

cola Ingersoll is not even a true var. here, just as var. *gredleri* Clessin on the old continent. The most beautiful specimens of this formation I have seen are from Maine, in the collection of Mr. Edw. S. Morse.

4. This subgenus—in mss. for nearly two years—will be characterized in another article in the NAUTILUS.

5. *P. curvidens* is very variable. The two extreme forms, *gracilis* and *floridana*, would unhesitatingly be regarded as widely distinct species, if not connected by intermediate forms; the latter comes nearest *P. pentodon*, the former resembles some forms of *P. hordeacella* Pilsb.

6. These species resemble the European forms so much in outline and general aspect that it seems best to range them in this group or subgenus, although the apertural folds are much more developed.

7. The subgenus has been criticised by my esteemed friend, Mr. Pilsbry* as being identical with *Vertilla* Moq.-Tand. If this were the case, it would of course, be worse than useless. *Vertilla* was established for the European *Vert. pusilla* Müll. and *Venetzii* Charp. (*angustior* Jeffr.), on account of their being sinistral. But the two are quite different in structure, for while the former is simply a Vertigo reversed, the latter, together with one similarly built, *P.* (*Vert*). *milium* Gld., constitute a peculiar group, which I have called *Angustula*, mainly characterized by the long and high gular lamella and some other peculiarities.

8. It is difficult to draw a limit between Pupa and Vertigo and may prove to be impossible; if so we will have to regard and treat the latter as a subgenus of Pupa, as many prominent European conchologists do. And it appears more natural standing in a line with Torquilla, Pupilla, Bifidaria, and its groups co-ordinate as sections with those of the subgenera named.

9. This interesting form has been detected in eastern Florida, Volusia Co., by Messrs. Geo. W. and his son Oscar B. Webster, of Lake Helen. These gentlemen spent several weeks in collecting this and other small mollusca, making a trip of over a hundred miles, and they first called my attention to this Vertigo. It is decidedly different from *rugosula* in several points, and, as I have seen no intermediate forms so far, it may prove to be distinct.

* NAUTILUS III, p. 84.

Although in shape and apertural parts much like *V. ovata* Say, *ovulum* is quite distinct, but it should be compared carefully with *V. antivertigo* Drap., of Europe.

A NEW AMERICAN HELIX.

BY C. W. JOHNSON AND H. A. PILSBRY.

A collection of shells made during the past winter at Woodville, Jackson Co., Alabama, by Mr. H. E. Sargent, and submitted to us for determination, contains numerous specimens of a large Helix, which proves to be undescribed. The species is a member of the section *Triodopsis* but it does not exhibit the characters typical of that group, *i. e.*, a three-toothed aperture, but rather belongs in the neighborhood of the *Helix appressa* of Say, a species which lacks the upper lip tooth of *Triodopsis*. The new species may be described as follows:

H. Sargenti n. sp.

Shell depressed, imperforate, lens-shaped, carinated. Surface strongly rib-striate, the striation disappearing toward the center of the base; under a lens the surface between the rib-like striæ is seen to be finely granulated. The aperture is wide, oblique; lip broadly reflexed, flattened, the basal lip bearing a long lamella, as in *H. appressa*. Upon the parietal wall there is a strong, high curved tooth, like that of *H. elevata* but longer. There are 6 whorls. The color is light russet above, paler or whitish below.

Alt. 11, diam. 24 mm.

Alt. 12, diam. 24 mm.

Alt. 9, diam. 22 mm.

This species differs from *H. appressa* in its larger size, stronger striation, the *granulated* instead of *spirally striate* microscopic sculpture, the strong carination, etc. It is allied in shape and sculpture to *H. carolinensis* Lea, but differs in totally lacking the upper lip tooth, in being flatter, more concave below, etc. The young shells differ markedly from young *H. appressa*, being flatter above, acutely carinated, and broadly umbilicated.

Figures will be published later, illustrating this unusually large and strongly characterized species.

Among other species Mr. Sargent found at Woodville the following interesting forms: *Patula cumberlandiana, Helix exoleta, H. stenotrema, H. spinosa, H. major, Zonites lævigatus, Z. gularis, Z. intertextus, Z. internus, etc.*

NOTE ON THE GROUP PANDA.

BY H. A. PILSBRY.

During the course of some studies upon certain Australian land shells, sent by the well-known conchologist Dr. J. C. Cox of Sydney, N. S. W., my attention was drawn to specimens of *Bulimus atomatus* Gray. Upon examining these shells under a lens, I at once noticed the minute sculpture and peculiar color-pattern characteristic of the two species hitherto included in the section PANDA,—*H. falconeri* Rve. and *H. maconelli* Rve. A consideration and comparison of the shells impresses me with the belief that *Panda* has heretofore been misunderstood and wrongly grouped. I am disposed to regard it now as a development from the *Bulimoid* branch of the *Helicidæ*, instead of from the *Helicoid* stem. The diagnosis of *Panda* must be enlarged to include elongated forms, (*Bul. atomatus* and perhaps some other Australian species), but it will not require much change otherwise. The prominent features of the group, as far as the shell goes, are (1) the entirely simple, non-thickened, non-expanded lip, reflexed at the columella, (2) the sculpture of minute, close incised lines, and (3) the painting of fine close wavy brown lines on a yellowish ground. This last character is not invariable, for clear yellow examples of most if not all of the species occur.

The character of the lip and embryonic whorls separate *Panda* from *Helicophanta* and the other sections formerly grouped by me under the generic name Macroön. It will be noted that I formerly included it in that place with doubt, on account of these peculiarities.

OBITUARY.

THE ABBÉ PROVANCHER.

It is our painful duty to record the death, in his 72nd year, of the Abbé Léon Provancher, who for many years, despite great dis-

couragements and disadvantages, labored zealously and assiduously to develop and disseminate a knowledge of the natural history of Canada, and especially of his native province. He was born in 1820, at Becancour, Quebec, and for some years was Curé of Portneuf, and one of his earliest entomological writings was a list of the Coleoptera of that district. Compelled by enfeebled health to relinquish the regular and more active duties of the ministry, he removed to Cap Rouge, near Quebec, and devoted his remaining time and strength almost entirely to the study of the natural sciences. In 1869 he commenced the publication of the *Naturaliste Canadien*, and notwithstanding many discouragements, completed in 1891 the 20th volume, when its issue was reluctantly abandoned, through the Quebec government refusing to continue the scanty annual grant it had received. In 1858 Provancher published an elementary treatise on botany and in 1862 his Flore du Canada. Subsequently he devoted his attention chiefly to entomology, and in 1874 commenced his Faune Entomologique du Canada, of which he completed three volumes.* Provancher was also, especially latterly, an enthusiastic conchologist, and as such became known by correspondence to many of the principal conchologists of the States. His last publication was a monographic illustrated treatise, Les Mollusques de la Province de Quebec, embodying the results of the author's researches in Canadian conchology.

The occasional inaccuracies of Provancher's conchological work will be excused when we consider the great disadvantages under which he labored. His death is a loss that will be felt long by the small band of Canadian Naturalists.

NEWS AND NOTES.

EDITOR OF NAUTILUS, Dear Sir: Thinking that the following extracts from a letter sent me a short time ago by a Western friend, would prove of interest to your readers, I take the liberty of offering them for publication.

The writer says: "I notice that much has been said in the NAUTILUS lately about the recent discovery of Unios having a byssus. In reference to this matter it would not be irrevelant for me to state

*See article by W. H. H. in the *Canadian Entomologist*, May, 1892, from which the preceding is taken.

that I found, nearly fifty years ago, *Unio lapillus*, Say, *jabalis* Lea, attached by a white, silk-like byssus to a fragment of an old shell. This fact I mentioned afterwards to John Bartlett, an old collector, whereupon he related to me the following story:

"A., a collector of shells, residing in Cincinnati, Ohio, and K., also a collector, residing in Cleveland, Ohio, were quite intimate. K. found the above mentioned species attached (as I did) by a byssus, whereupon he, K., wrote to A. at Cincinnati, stating the fact, and inviting him up to Cleveland, promising if he came, to go out with him and show him the wonder. A. was not long in responding to the invitation, and the two went out together and saw the shell attached by a byssus, sure enough.

"A. returned to Cincinnati soon afterwards and at once wrote to his London correspondent that he, A., had discovered a Unio attached by a byssus, and that he had invited his friend K., of Cleveland, to come down, and had taken him out to see the wonder.

"Soon after this K., being in correspondence, as it happened, with the same London party, wrote to him that he, K., had made this wonderful discovery in Cleveland, and had taken his Cincinnati friend out to see it. A., it seems, was ignorant of the fact that K. was in correspondence with the same London party, and so got himself inextricably trapped.

"My friend informed me that A. went by the name of 'Old Byssus' for a long time afterwards.

"So much for a lack of truth and candor. When the byssus was first discovered by myself, I, in my innocence of the facts just related, wrote to A. about it. He at once replied that it was not a new thing. It had been found before. I exchanged with A. quite a number of years after this and received some good things from him. Peace to his ashes! He is gone now, as are also most of the old collectors of Cincinnati."

These are the extracts and my only regret in sending them is the fact that I do not feel at liberty to give the name of the writer.

Very truly,

J. F.

Dr. R. E. C. Stearns, adjunct curator of the Department of Mollusks at the National Museum, has left Washington for the West Coast, for a season's rest.

Mr. Henry Hemphill will spend the summer in Idaho.

A. B. Kendig, D. D. has changed his residence from 11 Hanson Place, Brooklyn, to 287 *Williams St., East Orange, N. Jersey.*

Geo. T. Marston has removed from Dupere, Wis., to Quincy, Illinois.

Mr. Frederick Stearns of Detroit, Michigan, who has been spending the winter in the Sandwich Islands, has sailed for Japan, where he will travel during the summer.

Friend Pilsbry: Will you not suggest in the Nautilus that any conchologist travelling about the country should make it a point to call upon his brother collectors, if he goes near their homes? I hope no member if the A. A. C. who comes to Boston, will fail to visit me at Revere, only six miles away. Surely introductions are unnecessary in our little circle.—*Edward W. Roper.*

We heartily endorse this suggestion, friend Roper!

EXCHANGES.

Exchange notices of moderate length will be inserted free for subscribers.

I have several hundred unusually fine specimens of *Limnæa megasoma* Say, to exchange for specimens of *Sphærium* and *Pisidium.*—*George T. Marston, care of State Savings Loan and Trust Co., Quincy, Ill.*

Wanted.—Marine univalves, especially of Mexico, Central and South America. Offered—many specimens, Marine, Land, and Fresh-Water, both U. S. and Foreign.—*C. Browne, Framingham, Mass.*

Wanted.—To Exchange Northern Alabama Land and Fresh-water Shells for shells from any other locality. Send lists and receive mine.—*H. E. Sargent, Woodville, Jackson Co., Ala.*

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THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
H. A. PILSBRY, Conservator Conchological Section, Academy of Natural Sciences, Philadelphia.
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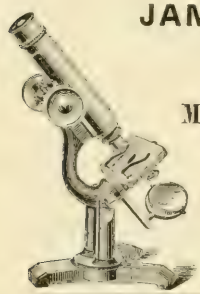

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THE NAUTILUS.

VOL. VI. JUNE, 1892. No. 2.

THE SHELL BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.

In the ten years which have elapsed since the last catalogue of Michigan shells was published, many species have been added to the fauna of the State and our knowledge of the distribution of others has been very largely increased. While it is not probable that in the future the number of species will be largely added to, there yet is abundant opportunity for our local collectors to add to what must be admitted to be, on the whole, a meagre knowledge of the exact range of the different species within our borders. Every local list, carefully compiled, has its value; and if the publication of this paper shall, by its incompleteness, serve to provoke the publication of the information already in the possession of the different collectors scattered over the state, it will have accomplished not the least of the purposes of its compilation.

The first catalogue of Michigan shells was published by Dr. Abram Sagar, Zoologist of the Geological Survey, in 1839, and enumerated seventy-six species.

The second, by Dr. Manly Miles, State Zoologist, was published in the "Report of the Geological Survey for 1860."

The third was compiled in 1868 by Mr. A. O. Currier, of Grand Rapids, and was published as one of the "Miscellaneous Publications of the Kent Scientific Institute."

In 1879 the writer published a fourth list in the Journal of Conchology, Vol. 2, p. 325.

The fifth and last general catalogue was published in 1881 as "Miscellaneous Publication No. 5 of the Kent Scientific Institute," and was compiled by Dr. W. H. De Camp, of Grand Rapids. Dr. De Camp has very kindly furnished me with a manuscript continuation of his catalogue to December, 1891, and I have made frequent use of it for this paper. Species cited upon his authority and not included in his original paper as published, will be understood to be quoted from this supplement.

In 1859 Mr. Currier published a "List of the shells collected in the Grand River Valley," and in 1865, "A Catalogue of the Mollusca of Grand Rapids, Michigan," (Am. Jour. of Conch. I, p. 292.) As Mr. Currier's catalogue of 1868 undoubtedly embodied all his researches up to that time, the few particulars in which these earlier lists differ from it do not require special mention, and references hereafter made are to that publication.

In the "Report of the United States Fish Commission for 1872–3," Mr. Sidney I. Smith, in a "Sketch of the Invertebrate Fauna of Lake Superior," gives a list of the mollusks of that region which, while it is largely a compilation from the publications of Binney and Gould, includes the result of a series of dredgings made under the direction of the United States Lake Survey, and is especially valuable in showing the depths at which the various species were found.

Preliminary reports of the same dredgings are to be found in Vol. 2 of the "Report of the Secretary of War for 1871," and in the "Am. Jour. of Sci. and Arts" for December, 1871.

A local list of the species found near Ann Arbor, Washtenaw county, was published by Mr. C. E. Beecher and myself in the "Proceedings of the Ann Arbor Scientific Association for 1875–6."

In addition to these lists many scattered references to Michigan species occur in the American Journal of Conchology and in the various writings of Binney, Gould, Lea, Tryon, Prime, Conrad and Call.

In compiling the present catalogue I have endeavored to include every species which has at any time been cited as an inhabitant of the State. Where any such species is not represented in my own collection I have given the authority for the citation.

In addition to my own collections, which have been mostly made in the southeastern and northern portions of the state, I am indebted to Dr. W. H. De Camp and Mr. L. H. Streng, of Grand Rapids,

for many specimens from the western part of the state; to Dr. M. L. Leach, of Wexford, for a great deal of valuable material from the central and northern portions; and to Mr. Jerome Trombly, of Petersburg, for the local species of Monroe County.

Dr. V. Sterki has very kindly examined all the Pupidæ in my possession, so that there can be no question as to the species of this family so far as they are cited from my own collection.

It is greatly to be regretted that so little is known of the shells of the upper peninsula. It is practically a *terra incognita* to the conchologist. With the exception of Gould's citations in Agassiz's "Lake Superior" and S. I. Smith's paper above referred to, I have not been able to find any published information in regard to the fauna of that very important portion of the State. Some very inconsiderable collections from a few points along the St. Mary's river comprise all my personal knowledge in this particular.

As no localities are given as a rule in the earlier catalogues, it is impossible to say what information, if any, their compilers had on this subject.

In view of this condition of affairs it might have been better to have limited the title of this paper to the lower peninsula. As it is, however, it will be understood that unless otherwise specified, all remarks as to distribution are confined in that portion of the state south of the Straits of Mackinac.

Selenites concavus Say. Throughout the lower peninsula and probably further north, as it occurs at Lime Island in the St. Mary's river.

Vitrina limpida Gld. Traverse City and Lime Island in the St. Mary's river are the only localities yet recorded for this species.

Zonites fuliginosus Griff. Southern part of the State.

Z. ligerus Say. Not uncommon in the southern part of the State.

[*Z. inornatus* Say. Cited by Sagar and Miles, but does not appear to have been found by more recent collectors.]

Z. cellarius Mull. A few specimens were found several years ago in a green-house in Detroit.

Z. nitidus Mull. Abundant everywhere.

Z. arboreus Say. Abundant everywhere.

Z. radiatulus Alder. Common but not as abundant as *arboreus*.

Z. indentatus Say. Common everywhere.

Z. limatulus Wd. Cited by De Camp from Traverse City; also by Miles and Currier.

Z. minusculus Binn. Generally distributed through the state.

Z. milium Mse. Islands in the St. Mary's river.

Z. binneyanus Mse. Cited by Binney from Tawas City. I have found it from Traverse City north to Lime Island. It is probably confined to the northern part of the state.

Z. ferreus Mse. Traverse City and Petoskey.

Z. exiguus Stimp. Generally distributed through the northern part of the State.

Z. fulvus Dr. Common everywhere.

Z. suppressus Say. Rare. Cited by Binney but does not appear in any of the catalogues. Dr. M. L. Leach sent me specimens from Fenton, Genessee County, a few years ago.

Z. multidentatus Say. Rare. Petoskey is the only locality known to me. Cited also by Currier and De Camp.

Patula alternata Say. Abundant everywhere.

P. alternata alba. This form occurred quite commonly with the type at Lime Island and Mackinac Island. Specimens from both localities exhibit all gradations from the typical coloring to the pure albino.

P. solitaria Say. An inhabitant of the southern portion of the state; very rare in the southeastern part, where in some localities it is extinct; more common in the western part.

P. perspectiva Say. Throughout the State.

P. striatella Anth. Common everywhere.

P. striatella alba. Mackinac Island is the only locality where I have found this form.

[*P. asteriscus* Mse. This species was cited in my catalogue of 1879 by mistake. I am not aware that it has yet been found in the state.]

P. lineata Say. Common everywhere.

P. harpa Say. Petoskey is the only locality thus far recorded.

Punctum pygmœum minutissimum Lea. Appears to be generally distributed through the state, but is easily overlooked on account of its small size.

H. clausa Say. Cited by Sagar and Miles but not by any recent collector.

H. multilineata Say. Common in the southern part of the state.

H. multilineata alba. Associated with type but not common.

H. multilineata unicolor. Cited by Currier and De Camp.

H. thyroides Say. Common throughout the state.

H. thyroides bucculenta Gld. Cited by De Camp.

H. albolabris Say. Common everywhere.

H. albolabris dentata. Occurs occasionally with the type.

H. albolabris martima Pils. Traverse City. Specimens of this well marked form were sent to me by Dr. M. L. Leach, which appear to be identical with examples from New Jersey. It has been persistent in its present form for ages, as it is found unchanged in the marl-beds upon which the living specimens were found. Dr. Leach thus describes the habitat of the species: "The locality is limited, containing only a few acres on and around the marl-bed where their remains in connection with fluviatile shells are found in a fossil condition. I find only now and then one of the same variety anywhere else and that always not far away."

A single specimen collected by Dr. Leach at Black Lake, Presque Isle county, is probably referable to the same variety. This would indicate a range across the entire northern part of the lower peninsula.

H. exoleta Binn. Common in the southern part of the state.

H. elevata Say. Rare, if found at all in the state. The Grand Rapids collectors have not found it, nor have I. Cited by Sagar and Miles whose citations are followed in later catalogues. It occurs in recent deposits near Ann Arbor, but is now extinct there.

H. profunda Say. Occurs commonly through the southern part of the state.

H. profunda alba. Occasionally associated with the type.

H. sayii Binn. Cited in most of the catalogues but appears to be rare and confined to the northern part of the state. Black Lake, Presque Isle County, where it was collected by Dr. Leach, is the only locality I know of.

H. hirsuta Say. Common everywhere.

H. monodon Rack. Common everywhere.

H. monodon fraterna Say. Not as common as the type.

H. leaii Ward. Southern part of the state, common.

H. tridentata Say. Appears to be generally distributed through the state as it is cited in all catalogues.

H. fallax Say. More abundant than *tridentata*, judging from my own experience.

H. palliata Say. Probably throughout the state although I have seen no specimens from localities north of Gratiot County.

H. palliata alba. Cited by Currier.

H. inflecta Say. Southern part of the state.

H. pulchella Mull. Common in the southern part of the state. The costate form does not appear to have been found in the state as yet. It occurs on Put-in-Bay Island, Lake Erie, and no doubt will eventually be found within our borders.

H. labyrinthica Say. Everywhere in greater or less abundance.

Pupa fallax Say. Cited by Miles. Ann Arbor is the only locality from which I have it.

P. corticaria Say. Cited by De Camp from Kent County.

P. armifera Say. Southern part of the state.

P. contracta Say. Everywhere. Common.

Vertigo decora Gld. Cited by De Camp from Kent County.

V. ovata Say. Generally distributed over the state.

[*V. gouldii* Binn. Cited by Miles and De Camp. My own citation of 1879 was an error based on a specimen now referred to *tridentata.*]

V. bollesiana Mse. Very generally distributed through the state.

V. ventricosa Mse. Cited by De Camp from Kent County.

V. tridentata Wolf. Ann Arbor.

V. pentodon Say. Common.

V. curvidens Gld. Oakland and Macomb Counties.

V. edentula simplex Gld. Not common but ranges generally over the state.

V. milium Gld. Southern part of the state.

Ferussacia subcylindrica L. Generally distributed over the state.

Succinea aurea Lea. Cited by De Camp from Kent county.

S. avara Say. Abundant everywhere. Also cited as *S. vermeta* Say, by Miles, Currier and De Camp.

[*S. campestris* Say. Cited by Sagar, but evidently a mistake for *S. obliqua* which does not occur in his list. Miles gives *obliqua* but also gives *campestris*, probably quoting blindly from Sagar in this as in other instances.]

S. obliqua Say. Common all over the state.

S. ovalis Gld. Abundant everywhere. This species is occasionally infested by a species of *Leucochloridium* similar to the *L. paradoxum* Carus, found in the *S. putris* L. of Europe and figured by Baudon in Jour. de Conch. V. 27, pl. X, fig. 6. In the same

journal (V. 28, p. 205) is published a note from the late Thomas Bland, recording a similar occurrence in a specimen of *S. obliqua* Say.

S. ovalis decampii Tryon. Described originally from Marshall in this state.

S. ovalis peoriensis Wolf. A number of years ago, at the suggestion of Dr. James Lewis, I sent examples of a *Succinea*, common in this vicinity, to Mr. John Wolf, of Canton, Illinois, who identified them as a form he had named as above. I am not aware that a formal description has ever been published. It is a well marked form, easily separated from *ovalis*, and occurs abundantly in all parts of the state. It is closely allied to *S. decampii* Tryon and may be identical, but differs in color and lacks the black margin said to be characteristic of that species.

S. ovalis higginsii Bld. Specimens from Alpena received from Dr. W. A. Nason and said to have been identified by Dr. James Lewis, are the only ones I have seen from this state. The specimens referred to lack the parietal tooth supposed to be characteristic of the form.

(*To be continued.*)

LITTORAL LAND SHELLS OF NEW JERSEY.

BY WM. B. MARSHALL.

H. A. Pilsbry's list of shells, published under the above title, in the April NAUTILUS, is deficient by at least one species. In August, 1890, I collected one specimen of *Succinea avara* Say at Cape May, N. J. The exact locality was on the ocean front, at 8th Avenue, Mt. Vernon, between Cape May City and Cape May Point, and was not more than 200 feet from the line of high tide.

Mr. Pilsbry says, "The Atlantic shore of New Jersey is so sandy that few land snails find suitable conditions there." It is very true that land snails are very uncommon along the shore, but, in my opinion, their rarity is due to some cause other than the nature of the soil. The chalky dead shells of mollusks and crustaceans, which are abundant in the vicinity of the shore, furnish the snails a ready supply of lime; and the wild pea vines which grow in tangled masses, covering large areas of ground, afford a succulent article of diet.

PHYSA HETEROSTROPHA.

BY O. A. CRANDALL, SEDALIA, MO.

Is there such a species as that described by Say? If so, what is it? I am led to make this inquiry after a study of this genus for several years. The first question will of course be answered unanimously in the affirmative, but how many will agree as to the main characteristics of the species? I have examined during the last year many lots labelled *P. heterostropha* Say, and have not found two lots alike. They include all forms from the cylindrical *P. gyrina* Say, to the shouldered *P. ancillaria* Say, and have any number of whorls from *three* to *six*. Most of them were labelled by amateurs, who have no means of identifying the species except by following a rather meagre printed description; and it can hardly be expected that all should agree. Very few collectors have opportunity to see type specimens, and it is very annoying to have to send every "find" to some noted conchologist for identification. Besides, I find about as much diversity of opinion regarding Physæ amongst our professors as amongst amateurs, hence, I write this article for the purpose of procuring a correct description of this species. Say describes the shell as "subovate, having *four* whorls, the first large, the others terminating rather abruptly in an acute apex; aperture large, somewhat oval, three-fourths the length of the shell, or rather more." These are the only characteristics given that are not common to many other shells. Binney, in "Land and Fresh Water Shells of N. A.," part 2, page 84, gives two figures: Fig. 144 from Say's type and Fig. 145 from Say's figure, which are about as near alike as a bean and a pea. Which shall we follow? The description is silent as to the form of the spire whorls and sutures, but from the fact that Fig. 144 shows convex whorls and impressed sutures, and from the other fact that Binney, after having seen the type specimen, placed in its synonymy *P. philippii* Kuster, *P. cylindrica* Newcomb, *P. fontana* Hald. and *P. plicata* De Kay, all of which have somewhat convex whorls and impressed sutures, it is fair to presume that these characters belong to the shell under consideration.

Add this presumption to the description given by Say, and we have a very fair description of what is generally considered one of our most common shells, and which ought to be easily identified by

any person who will hold strictly to the distinctive characters mentioned. But unfortunately Mr. Binney has placed *P. fontana*, having only *three* whorls, *P. plicata*, having *four to five* whorls, and two other species having *five* whorls each, and two species having flattened whorls, in the synonymy of this species, which has *four convex* whorls. There never can be a systematic classification of species until we cease to mix forms in this manner. The *number* and *form* of the whorls are the most reliable characters upon which a species can be based. It is one of the laws of nature that every animal, every bird and every insect, of the same species, builds its house in the same form. So the structures of every snail shell of the same species must be substantially the same as to texture, and number, and form of whorls. They may vary in color, height of spire, form of aperture and other characters that may be affected by accident or environment, but as to the structural form of its own skeleton it must follow its progenitors. So I conclude that every adult member of the same species must have the same number of whorls.

Coming back again to the main question. What is *Physa heterostropha* Say? It is a shell subovate in form, having *four* whorls, spire whorls *somewhat convex*, sutures *impressed*, spire elevated, terminating in an *acute* apex, aperture large and oval, but not inflated. The spire whorls are more convex than in *P. gyrina* Say and not so much as in *P. showalteri* Lea or *P. halei* Lea. It holds an intermediate place between the flattened and most convex whorls. It is never cylindrical, and the type is not inflated nor ventricose. Varieties may be slightly inflated but never so much as to resemble *P. vinosa* Gld. or *P. sayii* Tappan, which are frequently taken for this species.

If I am not correct, will some person who has seen the type specimen, revise and correct the description herein given?

NOTES ON THE NORTH AMERICAN SPECIES OF SUCCINEA.

BY T. D. A. COCKERELL.

For some time past I have been accumulating notes on the North American *Succinea*, hoping to be able to classify them more pre-

cisely than has hitherto been done. As I have no longer time or opportunity for this work, I venture to put together the following notes, on the chance of their proving useful to other students. The genus is a most difficult one, and until someone will elaborately monograph the American species as Baudon has the French ones, we seem hardly likely to arrive at any satisfactory arrangement. With regard to the opinions given below, it is to be understood that they are nothing better than *opinions*, founded on the material examined. Further study with more abundant material would very likely cause some of them to be altered.

The American species of *Succinea* may be divided into four sections, three of which have received subgeneric names.

Sect. 1. *Amphibinæ.*

= *Amphibina* (Htm.) Mörch.

(1.) *Succinea pfeifferi* Rossm. Many of the American forms of *ovalis* Gould are not to be separated from the European *pfeifferi*, while others, also hardly distinct from *ovalis*, might in the absence of intermediates be supposed to represent a peculiarly American species. The American forms of *Succinea*, both in this and other groups, are very closely allied, but at the same time seem more constant in their slight peculiarities than those of Europe. In *Ann. and Mag. of Nat. Hist.*, March, 1887, I referred *ovalis* to *pfeifferi*, and nothing since has appeared to prove otherwise.

(1a.) *S. pfeifferi* var. *brevis* Pascal. This variety was originally called *brevis*, but afterwards unnecessarily changed by Baudon to *brevispirata*, because there is a *S. brevis* in Central America. I received a characteristic specimen, collected by Mr. D. B. Cockerell at Toronto, Canada. In shape, this variety is very like *S. higginsi*, and probably the two will be found to intergrade.

(2.) *S. higginsi* Bland. Probably a variety or subspecies of *pfeifferi*, but a specimen marked *higginsi*, which I saw in the Binney and Bland Collection, at the American Museum of Natural History,[1] seemed to have affinity with *S. elegans*, while another in the same collection resembled *pfeifferi* very closely.

[1] I was much indebted to Mr. Sanderson Smith for his kindness in showing me this collection when I was in New York.

(3.) *S. haleana* Lea. A specimen in the Binney and Bland Collection, from Alexandria, La., marked "*halei* Lea, type," seems to me to be specifically identical with *ovalis* Gould.

(4.) *S. retusa* Lea. Said to be a variety or subspecies of *ovalis*, but so far as I was able to judge from a specimen in the Binney and Bland Collection, it is a valid species allied to *S. elegans*.

(5.) *S. concordialis* Gould. Mr. J. A. Singley sent me this from Lee Co., Texas. It is allied to *pfeifferi*, but more pellucid and shiny; thin but rather strong; color, very pale horn. I have also seen a specimen in the Binney and Bland Collection.

(6.) *S. forsheyi* Lea. A specimen in the Binney and Bland Collection is from Rutersville, Texas, the original locality. It is shiny and very near to *pfeifferi*.

(7.) *S. nuttalliana* Lea. Mr. J. H. Thomson sent me five specimens collected in Wyoming in 1877, which no doubt belong to *nuttalliana*. They are shiny, with lines of growth well marked; in shape, like *pfeifferi*, varying towards *avara*; color, like *avara*. A specimen in the Binney and Bland Collection, from Portland, Oregon, is similar.

(8.) *S. elegans* Risso. Mr. D. B. Cockerell sent me specimens found by rivers and streams at Toronto, which I could not distinguish specifically from the European *elegans*. At the same time, they are equally close to *S. haydeni* which may, I think, be considered a variety or subspecies of *elegans*. A specimen of *haydeni* in the Binney and Bland Collection tends to confirm this opinion.

(9.) *S. hawkinsi* Baird. This I have not seen, but it is apparently very close to *elegans*.

(*To be continued.*)

GENERAL NOTES.

In the July number of the NAUTILUS it is proposed to begin a series of articles upon the *collection* and *preservation* of shells. Notes bearing upon these subjects will be welcome.

"* * * While at Maldonado, Uruguay, I succeeded in finding *Helix costellata* D'Orb, under dead leaves in damp localities. While in the bay I procured about twenty dredgings with very good results, having at least three species of *Corbula*, and about fifty other

species of various genera. As we are to return to that place from time to time I will be enabled to add to them. The next few days I shall try to hunt up the *H. elevata* D'Orb, and the fresh-water species surrounding Montevideo.—*Dr. William H. Rush, in letter to Ed.*

HELICINA OCCULTA Say, has been re-discovered *living* in western Pennsylvania at Wildwood and at Cayuga, on the Allegheny River, Allegheny Co., by Mr. S. H. Stupakoff of Swissvale, Pa.

THE OLD, OLD STORY!—A number of fine pearls, some of them of considerable value, were found recently in mussel shells on the shoals in White river, near Seymour, Ind. One man realized $75 from his find in a few weeks.—*Phila. Public Ledger.*

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HERKIMER COUNTY LAND AND FRESH-WATER SHELLS to exchange for desirable species from other localities. Send lists and receive mine.—*Albert Bailey, Chepachet, N. Y.*

I HAVE SEVERAL hundred unusually fine specimens of *Limnæa megasoma* Say, to exchange for specimens of *Sphærium* and *Pisidium*.—*George T. Marston, care of State Savings Loan and Trust Co., Quincy, Ill.*

WANTED.—Marine univalves, especially of Mexico, Central and South America. Offered—many specimens, Marine, Land, and Fresh-Water, both U. S. and Foreign.—*C. Browne, Framingham, Mass.*

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C. W. Johnson, Acting Curator Wagner Institute of Science.

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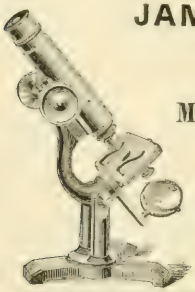

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WALKER, MOLLUSCA OF MICHIGAN.

THE NAUTILUS.

VOL. VI. JULY, 1892. No. 3.

SOME REMARKS ON NEW JERSEY COAST SHELLS.

BY JOHN FORD.*

Of the thousands of visitors to Atlantic City, Cape May and adjacent seaside towns, perhaps not one-tenth part give a thought to the myriads of living creatures other than human that sport in the surf, dally in the pools or hide in the sheltering sands. Yet it is not unlikely that the most superficial examination of these lowly forms would convince the observer that even seaside resorts may yield nobler pleasures than those of a physical nature only.

How many of these persons, I wonder, know that the despised Sea Nettles (Medusæ) often exhibit forms of surpassing beauty, rivaling in structure the most delicate of laces! And who of all the vast crowd think it worth while to note the wonderful variations in structure of the many species of crabs, shrimp, sandhoppers and other crustaceans dwelling between tides, and in some instances, in sands above the surf? Yet few if any phases of animal life, not even the transformation of a caterpillar to a butterfly, are as

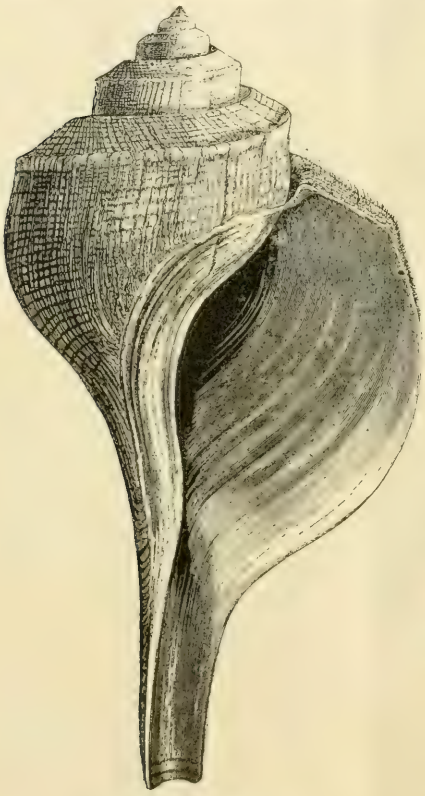
* Editor of NAUTILUS,

Dear Sir:

The thought has occurred to me that many of the NAUTILUS readers would be interested, now and then, in articles less technical and scientific than those usually presented in its columns. In order to test the matter I take the liberty of offering for insertion the subjoined chat regarding New Jersey Coast Mollusks and a few of their neighbors. Very truly,

JOHN FORD.

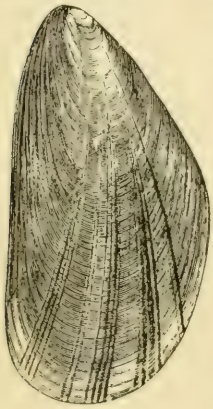
remarkable as the periodic metamorphoses of certain species belonging to this order. Near the water's edge, when the tide is low, many other interesting creatures may be seen, including the sea anemones with their parti-colored crowns of tentacles; and pretty plant-like forms (Corallines) whose chief representative on the New Jersey coast is the so-called fox or squirrel-tail *Sertularia argentea* Johnson. To most persons this appears to be an ordinary sea plant, but the careful student knows that in each of the tiny cells adorning the undried specimen, dwells one of the little architects and builders of the whole graceful structure.



Fulgur canaliculata.

None of these creatures, however, are more worthy of observation or study than are the native mollusks, reference to which is the chief purpose of this article. These dwell on the entire coast in countless numbers, but they are seldom exposed in quantity except by southeastern storms or gales which, striking the beach breast on, often tear up and carry large masses of sand with their unfortunate occupants beyond the reach of succeeding tides. It is not unusual for hundreds of tons of mollusks to be thus forced from their homes and left to die of starvation and exposure. Quite a number of the native species are edible. The first of these in the order of demand is, of course, the oyster, *Ostrea virginica;* next, the hard shell clam, *Venus mercenaria*; third, that precious favorite of all New York aldermen, the soft shell clam, *Mya arenaria.* He who has not eaten a dish of these on Coney Island beach

would be deemed by the said New York magnates a "very unfortunate man" indeed. Less delicate in flavor than the latter species are the common sea clams, *Mactra solidissima*, when not more than half grown. Sea mussels, *Mytilus edulis*, are also considered palatable though they are not very highly relished in this vicinity. In New York and New England, however, they are much esteemed by epicures.



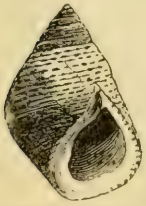
Mytilus edulis var. pellucidus.

Among the fishermen of Long Island Sound the large Conch, *Fulgur carica*, is often utilized for soup. But the writer knows by experience that this is not the kind of food a delicate palate will long for.

Another edible species, and one far more toothsome, is the little periwinkle, *Litorina litorea*, a species probably introduced from Europe. Until recently they were quite rare south of Raritan Bay, but at present a fine colony may be seen on the flats a little west of the Inlet House at Atlantic City. The pretty species, *Litorina irrorata*, a more southern form, also edible, appeared in large numbers on the bay side, near Longport, N. J., about three years ago, but the conditions surrounding them changed shortly afterward and the colony disappeared quite as quickly and mysteriously as it came. A few specimens may still be secured on the adjacent flats but they are much less perfect than were those of the colony referred to.

Litorina litorea.

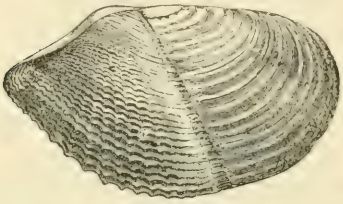
Many of the shells produced by the several species mentioned are well worthy of a niche in the collector's cabinet, especially so if taken alive and *in situ*. Otherwise the more recent additions to the lip-edges are apt to be injured by the action of the surf.



Litorina irrorata.

But there are hosts of other native shells besides those referred to, that may be profitably utilized by lovers of Nature's handiwork. Among the most prominent of these are the large pear-shaped Conch, *Fulgur canaliculata;* the several species of Pholades, including the largest known form, *Pholas costata*, which often secretes itself in the hardest limestone;

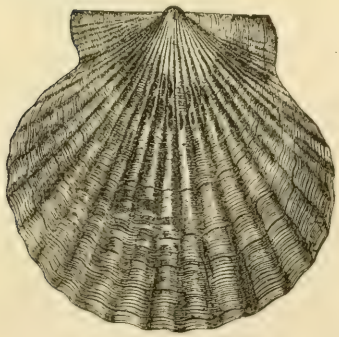
the canoe shells, *Modiola plicatula*; the razors, *Solen americanus* and *S. viridis;* the arks, *Arca pexata* and *A. transversa;* the boat shells, *Naticaheros* and *N. duplicata;* the cup and saucer shells, *Crepidula plana*, *C. fornicata* and *C. glauca;* the ladder shells, *Scala humphreysii* and (rarely) *S. lineata;* the scallops, *Pecten irradians*, the adductor muscles of which are largely used for food, thousands of gallons being sold annually by the coast fishermen. In addition to these there are several small species belonging to the genera *Columbella*, *Nassa* and others, making the entire number living between Brigantine Inlet and Cape May about fifty species. At no special point, even on the most favorable occasions, can all of these be obtained. A large share, however, may at times be secured on the sea and bay shores near Longport, at Townsend's Inlet, Five Mile Beach and the Inlet two or three miles northeast of Cape May. But there is no locality known to the writer where species are so plentiful as at Anglesea; here, during a short visit last summer, thirty-nine species were secured by him.



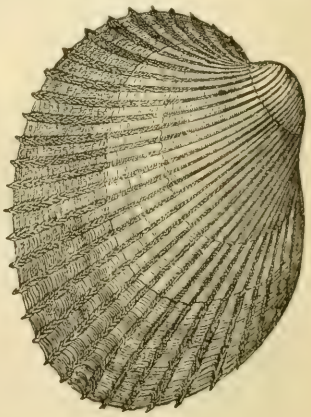
Pholas (Zirphæa) crispata.

Scala Humphreysii.

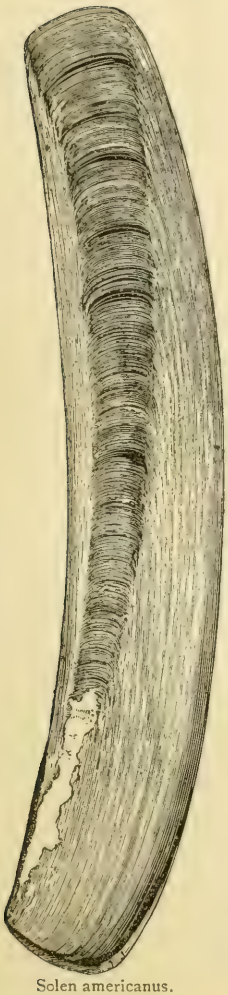
Nearly all of these were found living on a small peninsula about a half mile south of the Anglesea Hotel. *Fulgur carica*, the largest of our coast shells, were unusu-



Pecten irradians.



Arca pexata.



Solen americanus.

ally abundant, many of them being perfect in form, and exhibiting in the apertures the rarest shades of crimson, purple and orange. Excellent specimens of *Natica duplicata* were also found here *in situ*, these offering a new revelation to the collector as he saw, when lifting them from their beds, fine jets of water spouting in every direction from the edges of each large saucer-shaped foot. Both of these species were carried to the hotel and boiled—the former about ten minutes the latter two or three minutes. This made the removal of the animals an easy matter, leaving the lustre of the shells and color of the apertures uninjured. It should be remembered that the peninsula referred to is only free from water when the tide is nearing its lowest stage; also that the tide is low there at about the same hour it is high in Philadelphia.

In conclusion it may be well to inform the young collector that in the search for sea shells at least three adjuncts are necessary—a trowel for digging purposes, a water-tight jar for preserving living specimens and a good sized basket for large shells. With these in hand, and a taste for the work, there is no reason in the world why he shouldn't be both successful and happy.

NOTES ON THE NORTH AMERICAN SPECIES OF SUCCINEA.

BY T. D. A. COCKERELL.

(Continued from last number.)

(10.) *S. sillimani* Bland. This also may have to be united with *elegans*. Mr. L. B. Elliott sent me a specimen, pale horn

color, fragile and thin, collected at Denver, Colorado. There is a similar specimen in the Binney and Bland Collection.

(11.) *S. salleana* Pfr. A specimen in the Binney and Bland Collection, from Alexandria, La., is white, and allied to *S. elegans.*

(12.) *S. wilsoni* Lea. Mr. Singley sent me this from Brevard Co., Florida, and I make the following note: *pfeifferi* group; may be a good species; amber color, rather shiny, more obtuse and swollen than most *pfeifferi.* Agrees with Lea's description, but spire shorter than in his figure.

(13.) *S. effusa* Shutt. A specimen in the Binney and Bland Collection is from Spring Garden Lake, Fla. A good species, allied to *pfeifferi.*

Sect. II. *Neritostomæ.*

= *Neritostoma* (Klein) Mörch.

(14.) *S. putris* L. *S. obliqua* is generally not to be distinguished in anything from this. I found *putris* in 1887 close to the Cave of the Winds, at Niagara Falls. There is also a specimen from Niagara in the Binney and Bland Collection, marked *obliqua.* Mr. Singley sent me specimens of *obliqua,* collected in Carleton Co., Ontario, Canada. They approach *S. virescens* Jeffreys (non Morel.) rather than *putris,* the color being pale greenish-horn. One form, which may be considered typical, was 16 mill. long, spire 5½ mill. long, texture like *putris.* The other, which represented a variety, was 15 mill. long, spire 3½ mill. long—a more globose shell, which can probably not be separated from *S. virescens* Jeff., of Europe. Say's var. *ovalis* is very near to this.

(15.) *S. totteniana* Lea. I received this from Mr. Singley, collected by Mr. E. W. Roper at Revere, Mass. It is, I think, a good species—an extreme form allied to *virescens.* Shell yellowish-green, inflated and thin, whorls rounded, mouth broad, spire short.

(16.) *S. grosvenorii* Lea. Specimens from Lee Co., Texas, were kindly submitted to me by Mr. Singley. They comprised two forms, one greenish and the other, which may be called var. *rufescens,* reddish and more globose. The species is a good

deal like *putris*, but smallish and spire longer; whorls convex. It seems to be a good species. I have also seen it from Alexandria, La., in the Binney and Bland Collection.

(17.) *S. stretchiana* Bland. I have seen this from San Francisco, Cal. (G. W. Michael), sent by Mr. Singley. It seems to be a small species of the *putris* group, allied to *S. parvula* Drouët, of Europe. Reddish-horn, not very shiny, striate, spire rather large. In the Binney and Bland Collection, one from Washoe Co., Nevada, looks rather like *avara*, at least in color; but another from Oregon is brown and resembles the *putris* group. There is a form *major* Ancey, ms. (sine descr.), nearly twice the size of the type, recorded by Yarrow, from Pagosa, Colo.

THE SHELL BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.

Carychium exiguum Say. Common everywhere.

C. exile H. C. Lea. Although not as common as *C. exiguum*, the localities where this form has been found indicate that it will be found generally distributed over the state.

Limnæa stagnalis L. Pl. I, fig. 6.

Occurs all over the State, often in great abundance. An extreme form, in which the body whorl is obtusely angulated, and the aperture much enlarged, from Houghton Lake, Roscommon County, is shown in fig. 6.

L. stagnalis jugularis Say. Pl. I, figs. 1, 2, 3.

I think this form is entitled to varietal rank. It is not as common as the typical form and seems to occur usually by itself. Figures 1, 2 and 3 from Black Lake, Presque Isle County, may be referred here; but the expansion of the lip, especially of fig. 1, is not typical, and is probably due to some peculiar local conditions. All the specimens from this locality are a pure translucent white. The *Physa fragilis* of Mighels is probably a similar case in another genus.

L. stagnalis sanctæmariæ. Pl. I, figs. 4 and 5.

This form from the Neebish Rapids of the St. Mary's River is well characterized by its small size, and the flattening of the upper part of the body whorl, which gives a mammilliform appearance to the short, rapidly acuminating spire. The relative size of this variety and the typical *L. stagnalis* is shown by comparing figs. 4 and 5 with fig. 6.

L. ampla Migh. Houghton Lake, Roscommon County, is the only locality I know of for this species. Specimens from there, submitted to the late Dr. James Lewis, were so named by him. In the form in which it is found in Michigan, it seems doubtfully distinct from *L. emarginata* Say.

L. decollata Migh. Cited by Currier and DeCamp. I have with some hesitation referred specimens from Mullet Lake, Sheboygan County, to this form.

L. megasoma Say. Occurs in great abundance in the Higgins River, Roscommon County; also found at different localities in the St. Mary's River. It seems to be confined to the northern part of the state.

L. reflexa Say. Pl. I, fig. 8.

Generally distributed over the state, and as usual in the genus, exhibits a considerable degree of variability. In some forms it is difficult to distinguish from *L. palustris* Mull. *L. umbrosa* Say is cited by De Camp as distinct. Fig. 8 is a specimen with a remarkably expanded lip, from the River Rouge, Wayne County.

L. reflexa zebra Tryon. Occurs frequently, associated with the type, and is easily connected with it in any considerable number of specimens.

L. reflexa exilis Lea. The specimens on which the citation of this form in the catalogue of 1879 was based, are referred to the type by Mr. Pilsbry. They differ sufficiently from the large form usually found, as figured by Haldeman (Monograph pl. 8), although the whorls are not as flattened as the typical *exilis* from the Western States requires.

L. reflexa kirtlandiana Lea. This form is not entitled to more than varietal rank. Specimens from the original locality in Ohio agree very closely with examples from southern Michigan. Specimens from the St. Mary's River are more slender and more fragile, and are nearer to Utah examples received under this name from Mr. Hemphill.

L. reflexa scalaris. Pl. I, fig. 7.

Spire elongated, whorls rounded and suture deeply impressed. This form, which occurs occasionally, associated with the type, in the marshes at the mouth of the Rouge River, Wayne County, I cited without sufficient consideration, in my catalogue of 1879 as *var. distortus* Rossm.

L. columella Say. Southern part of the state but not abundant.

L. lanceata Gld. This may prove to be a form of *L. reflexa.* It is cited in all the catalogues, but I believe wholly because the original specimens came from the north shore of Lake Superior. Specimens from Belle Isle, Detroit River, are said by Pilsbry to be close to Gould's types in the Academy's collection.

L. palustris Mull. Found everywhere in great abundance and variety. A striped form similar to *L. reflexa zebra* is sometimes found. *Limnophysa fragilis* Linn., cited by De Camp, would seem to belong here. Dr. De Camp informs me that the *L. intertexta* of Currier, cited in his catalogue but never described, is a form of this species.

L. palustris michiganensis. Pl. I, figs. 9 and 10.

This form is similar to variety D, as figured by Haldeman in his Monograph pl. 6, fig. 7, but is much smaller, the length being but half an inch. It is very delicately striate and under the glass shows many very fine spiral lines cutting the striæ. The aperture is just one-half the length of the shell. The lip is thickened by a rib within the inner margin, which shows itself as a white band on the outer surface. Spire acute, suture impressed, umbilicus small.

Haldeman's figure above cited, if reduced nearly one-half, would be an excellent representation of this variety; except that the whorls are more rounded and suture more deeply impressed than in this form. Figure 9 is from Ecorse and figure 10 from Greenfield, Wayne County. I am indebted for examples from Oregon to Mr. Pilsbry, who informs me that it ranges west from Michigan to Washington.

L. binneyi Tryon. Cited by De Camp from Houghton Lake.

L. haydeni Lea. Cited by De Camp from Houghton Lake.

L. traskii Tryon. Cited by De Camp from Newaygo County.

L. contracta Currier. Higgins Lake, Roscommon County is the only locality known for this curious form. It is either a semi-fossil, extinct species or an inhabitant of deep water, as only dead specimens have ever been found as I have been informed.

L. emarginata Say. A very abundant species through the northern part of the state and of great variety. Its most characteristic feature being a thick heavy shell, usually pure white and usually quite opaque, sometimes translucent. Specimens from Higgins Lake, Roscommon County, exhibit great variety in the form of the aperture which is frequently much expanded. Specimens from Sault St. Marie approach very close to Haldeman's figures of his *L. serrata* (Mon. pl. 2, fig. 6–8).

L. catascopium Say. An abundant and characteristic species of the Great Lakes, and their connecting rivers. Specimens from the north acquire the thick solid shell so common in *emarginata.*

L. caperata Say. Cited by Miles, Currier, Smith and De Camp.

L. cubensis Pfr. This form, hitherto known as *L. umbilicata* Ads., has a range over the whole of the State.

L. pallida Ad. Cited by Miles, Currier and De Camp.

L. desidiosa Say. Very common everywhere.

L. humilis Say. Very common and variable.

L. galbana Say (?) The form thus doubtfully designated, if not the living representative of Say's fossil species, has never been described. It has been found in Emmet, Grand Traverse, Alpena and Oakland Counties, and would thus seem to have a wide range through the state. It is a well marked form and seems to be subject to less variation than is usual in this genus.

L. bulimoides Lea. Cited by De Camp, "found in greenhouse, probably introduced by plants."

L. gracilis Jay. Reed's Lake, Kent County, is the only Michigan locality known for this species.

Physa lordi Baird. Northern part of the state. *P. parkeri* Currier, from Houghton Lake, is generally considered a synonym.

P. ancillaria Say. Generally distributed over the State, and exhibits a great degree of variability.

P. sayi Tapp. Very common. Cited by Currier and De Camp as *var. Warreniana Lea.* Specimens from a small pond near Traverse City, collected by Dr. Leach, are remarkable for the tenuity of the shell and the expansion of the outer lip. In some instances the newly formed lip was so thin as to be completely reflected back on the outside of the shell. Whether the local influences in this case were similar to those which, according to Prof. E. S. Morse, produced the *Physa fragilis* Mighels I cannot tell; but the two forms would seem to be identical.

P. vinosa Gld. Originally described from specimens collected on the north shore of Lake Superior, this species has been cited by Miles, Currier, Smith and De Camp without further knowledge of its occurrence. Recently, however, specimens from the Detroit River and St. Clair Flats have been referred to this form by Mr. R. E. C. Stearns, of the U. S. Nat. Museum.

P. anatina Lea. Although not cited from the western part of the state, its occurrence in Washtenaw, Macomb, Lapeer and Grand Traverse Counties show that it has a general distribution through the eastern and northern part of the state. Mr. R. E. C. Stearns, speaking of specimens from the Clinton River, Macomb County says: "Your specimens are the brightest and handsomest I have seen."

P. pomilia Con. Cited by De Camp as *var. Showalteri* Lea. I am indebted to Mr. Streng for specimens from Grand Rapids.

P. gyrina Say. Very abundant and in great variety of form.

P. gyrina hildrethiana Lea. Very common everywhere.

P. elliptica Lea. Cited by De Camp, as are also *P. oleacea* Tryon and *Febigeri* Lea, which are considered as synonyms by Tryon.

P. heterostropha Say. Common everywhere and in almost infinite variety.

P. brevispira Lea. Specimens from the Detroit River have been identified as this species by Mr. Pilsbry.

P. deformis Currier. This species, originally described from Grand Rapids, is cited also by De Camp in his catalogue. Dr. De Camp writes: "I do not believe that this is a distinct species."

Aplexa hypnorum L. Common everywhere.

A. hypnorum tryoni Currier. Distinguished by its larger size and deeper coloring.

A. integra Hald. Generally distributed through the state and quite common. I follow Tryon in including Lea's *P. niagarensis* as a synonym. Mr. R. E. C. Stearns, however, informs me that our Michigan species is *niagarensis* and that Haldeman's *integra* is a southern species not extending further north than Indiana. The Michigan form agrees, however, with specimens received as *P. integra* from the late Dr. Jas. Lewis.

To be concluded.

GENERAL NOTES.

Goniobasis virginica in Conn. The collection of the American Asso. of Conchologists has received specimens of the above species collected by Rev. Geo. D. Reid, from the Connecticut River, at Deep River, Conn. This is not far from the mouth of the river, and is, we believe, the eartermost locality reported for any species of this family in the United States. The specimens are large and well-developed, averaging over an inch in length. Both the smooth form and the spirally lirate var. *multilineata* occur.

Mr. Williard M. Wood, of San Francisco, California, has gone on a collecting trip to Monterey Bay, where some new and rare species have recently been found. He will remain there during the month of July.

Planorbis multivolvis.—I have lately received several specimens of *Planorbis multivolvis* Case, collected in the Island of Newfoundland, by a friend engaged on a surveying staff. They were found in the neighborhood of Brathurst Lake. I have not seen the Michigan form, but Mr. Bryant Walker, to whom I submitted my shells, tells me the Newfoundland specimens are "rather smaller and thinner but identical in form."—*W. J. Farrer, Orange, Va.*

EXCHANGES.

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THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
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ASSOCIATE EDITOR:
C. W. JOHNSON, Acting Curator Wagner Institute of Science.

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COLLECTING NOTES.

BY CHAS. T. SIMPSON.

During a brief vacation last Christmas, Mr. John B. Henderson, Jr., of Washington, and the writer made a flying visit to the west coast of Florida, in the vicinity of Tampa Bay, for the purpose of collecting shells; and I have thought that perhaps a few notes on our work might be of interest to the readers of the Nautilus. The country throughout this region consists of ordinary sandy pine land, interspersed here and there with ponds and hammock or hardwood tracts of from an acre or so to several miles in extent. This region in general is one of the flattest on the globe, and as a consequence the sea is in most places quite shallow and thousands of acres of mud flats are often laid bare at very low tides or during "Northers," affording wonderfully rich collecting grounds for the naturalist. We fitted ourselves out with a five or six ton sail-boat accompanied by a skipper and a good-natured cook, and with two weeks provisions, a gallon of alcohol, a dredge, and several large note books which were to be filled with original observations and discoveries, we sailed away as eager for adventures as Lord Bateman.

I want to say to anyone who attempts to collect marine shells or animals, that first and foremost it is all important to use the dredge. This implement is so simple, so easily constructed, and is so efficient that the merest tyro never ought to try to get along without it. A full description of one and its mode of working can be found in Wood-

ward's Manual of Conchology, and one that brings the matter down to date will soon appear in a forthcoming paper by Dr. Dall on collecting. We threw overboard our dredge in the warm bright waters of Tampa Bay as the boat was brought up into the wind, and awaited results. There is a certain kind of excitement about the operation; the jar and tremble of the rope as the implement—far down out of sight—scrapes over the bottom, gathering in the treasures of the deep, produces a sensation akin to that which an angler feels when he gets a bite, or a sportsman when he sights game and "draws a bead." And this feeling reaches a fever heat when the dredge is hoisted slowly, leaving a cloudy wake in the water, and its contents are dumped into the screen.

Starfishes, echini, perhaps a big horseshoe crab or two, and, mingled with living mollusks and fishes there may probably be dead shells inhabited by various forms of hermit crabs, fish, sea-worms and a dozen other kinds of life, many of which may be puzzling even to an experienced naturalist. There is something wonderful about all this, and entirely different from shore collecting; the animals are taken in their homes, caught in the very act of carrying on their ordinary avocations, and it is not to be wondered at that they seem to have a kind of surprised appearance when they are tumbled out indiscriminately on deck. There is always an element of uncertainty about dredging that furnishes a mild excitement akin to that of gambling. One throw, or a half dozen in succession, may turn out to be "water hauls," bringing up nothing but mud or possibly sea urchins, and the "just once more before we go away" may bring up half a hundred species, some of them rare, and all desirable.

The vicinity of Tampa Bay is rich in marine species and is classic ground to the conchologist and the collector, it having been worked over by Agassiz, Conrad, Stimpson, Spinner, and other noted men who have passed on, and Drs. Stearns and Dall, Velie, Calkins, and others who are still with us; and often a run along the shores of some of the outer keys, or about the muddy, sandy bays, will reveal shells enough to turn the head of even a steady-going experienced conchologist. And at such times it always happens that when the collector gets every bucket, and sack, and basket, and both hands loaded down to the last limit with things that are good enough in all conscience, and is miles away from his boat, he begins to run upon numbers of such marvelously rare and beautiful things that

he is tempted to throw away every thing he already has and begin entirely anew.

Prof. Hornaday spoke the truth when he said that "the collector's life is a constant race for specimens." In the few brief days we had at our command we felt that we must "make hay while the sun shone." But dredging, though very delightful at first, when followed up for eight or ten hours consecutively gets to be a good deal like work, and hard, heavy, wet work too. So we did what I should advise all collectors in similar circumstances to do; we went ashore during low tides and searched sometimes the sandy bays, the limited areas of rocky shore to be found about that region, or the open beaches; and during high tide we dredged. One rocky bed laid bare at low tide in Terraciea Bay was marvelously rich in *Tritonidea tincta*, *Cerithium floridanum*, *Semele reticulata*, *Murex nuceus*, *Cumingia tellinoidea*, *Nassa consensa*, *Muricidea multangula*, *Urosalpinx perrugatus*, and some other forms not often found on the sand.

Mrs. Mean's injunction "while yer a gittin' git a plenty" especially applies to the collector. One is prone when he sees anything in great abundance to feel as though it was very common and was hardly worth taking. Even the sight of a very rare mollusk in quantities somehow lowers its value in one's estimation. But the old collector who has let such chances go a few times, and afterwards where his entire stock of the same thing has run out, regrets his folly, learns to take all he can get of anything that is good. One may find a species thrown up to-day by millions on a certain shore, in excellent condition, and the next week, and for years afterwards, he may not run across a dozen individuals of the same. I had lived near Tampa Bay for four years and collected industriously, but throughout my whole residence I never found a hundred specimens of *Olivella mutica*, dead or alive. During our visit the dredge brought them up living, glittering like dew drops, by the handfuls. We dredged over and over the ground on which I once obtained in quantities of *Venericardia tridentata* and *flabella*, *Parastarte triquetra*, and *Pandora trilineata*, and scarcely found a specimen, while on the same ground we got a great many Tubonillas, an abundance of *Conus peali*, and a half bushel or more *Arca transversa*, not a specimen of which I had ever found there before; and on a sand flat that used to gladden my eyes with *Conus floridanus* not a single one could we find.

The shell mounds—the *Kitchen middens* of prehistoric tribes—are usually overgrown with tropical scrub, and are rich in land shells as well as mosquitoes and sand flies; and on one of these at Shaw's Point I rediscovered *Zonites dallianus* which I first found there three years ago, and, at the time, supposed to be the very different *Zonites minusculus*. In places the brackish water was swarming with *Cerithium minimum*, and *muscarium*, *Melampus coffea*, *Macoma constricta*, *Natica duplicata* and its companion *Melongena corona*, *Lucina Jamaicensis*, *Cerithidea scalariformis*, *Modiola plicatula*, var. *semicostata*, *Mytilus hamatus*, and the two Cyrenas, *floridana* and *carolinensis*. The ponds were alive with *Physa heterostropta* var. *pomilia*, *Succinea luteola*, which seems about as completely aquatic as any of the pond snails, *Planorbis tumidus*, which is a form of the protean and widely distributed *trivolvis;* and on the keys several of the Polygyras were abundant.

Our ten days of collecting came to an end all too soon, for although we had worked very hard and gathered in some 200 species and perhaps 25,000 specimens, we had not had time to write a half dozen notes, and we had only made a beginning at what we wanted to accomplish. We packed our material and bid good-by reluctantly to the land of palmettoes, warm breezes and sparkling waters, carrying with us bright, happy memories that will only grow pleasanter as time passes away.

ON ATLANTIC CREPIDULAS.

BY WITMER STONE, PHILADELPHIA, PA.

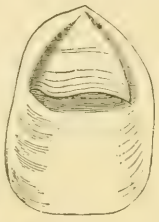
During the summer of 1891 while at Cape May, N. J., I made a considerable collection of Crepidulas of all ages and varieties with a view to studying the relationship of the several species found on the New Jersey coast; and some of the possibilities suggested by an examination of this material may prove of interest.

We have on this portion of the Atlantic seaboard four nominal species, of which three, *C. fornicata*, *convexa* and *glauca*, grow upon the outside or convex surfaces of the shells upon which they occur,

while one, *C. plana*, grows upon the inside or concave surface. The curvature of the surface upon which the Crepidulas grow has naturally produced a similar curvature in their own shells as it would otherwise be impossible for them to retain their hold. We therefore find that the three species first mentioned are convex in shape, while *C. plana* is concave.

Crepidula fornicata.

With this fact before us the question naturally arises: why is not *C. plana* a mere form of *C. fornicata* produced from eggs of the latter species which happened to be deposited on the inside of the host shell? A series of specimens collected with their hosts, however, shows that young *fornicata* is sometimes found on the inner or concave surface of *Natica* and *Fulgur* and retains all the characters of the species, being easily separated from the young of *plana*. The fact, however, that none but very small fornicatas are found in such positions, seems to show that the tendency to a convex form makes it impossible for them to retain their hold for any length of time on a concave surface. In other words, the tendency towards *convex* and *concave* shells has now become a fixed specific character.



Crepidula plana.

As to the original ancestry of *C. plana* there does not seem to me any doubt but that either this species has descended from a shell of the *C. fornicata* style or better perhaps that both species have developed from a free snail which formed the habit of attaching itself to other shells and whose characters have been gradually altered to suit its habits. Some of the individuals have thus adapted themselves to the convex and some to the concave surfaces of their hosts, and so eventually produced two distinct species. This theory is strengthened by studying the Crepidulas from other parts of the world, for my friend Mr. Pilsbry, tells me that on nearly every coast where a convex *Crepidula* is found there is also a concave species corresponding to our *C. plana*.

As regards our three convex Crepidulas, *C. glauca* and *C. convexa* are undoubtedly much more closely related to each other than either

Crepidula glauca.

is to *C. fornicata*, as has been already noticed by Mr. Pilsbry. In both of them the beak projects almost directly forward and stands clear above the margin, while in *C. fornicata* it is very much to one side and rests directly on the margin. This seems to be caused by the concentric additions to the shell being very unequal—*i. e.* wider on one side than on the other—in the latter species. The outline of the posterior margin of the "deck" or septum in *C. fornicata* is also different.

The difference between *C. glauca* and *convexa* is entirely one of shape and is apparently due primarily to the character of the surface on which they live, as *C. glauca* occurs on large shells where the curvature is slight and *C. convexa* on small, very convex shells such as *Nassa obsoleta*, where considerable curvature is necessary to enable the *Crepidula* to bring the entire margin of its shell in contact with the surface of its host.

Whether this difference of shape is to be regarded as a specific or subspecific character is a question dependent entirely upon the extent to which this adaptation to two styles of surface has proceeded. If shells of intermediate form occur, then *C. convexa* is merely a subspecies. Among those which I have thus far examined I have seen no intermediates.

C. convexa.

The fact that we have at least two distinct convex Crepidulas upon the New Jersey coast naturally suggests the possibility that we may have had at one time, two concave species; one developed from the same stock as *C. fornicata*, as already described, and the other in a similar manner from the *C. glauca* stock. The similar environment and degenerate nature of "inside growers" would tend to obliterate the original specific differences, so that the two might easily have become merged into what we know as *C. plana*.

Anatomical investigations might throw additional light upon these questions, and a careful study of the genus will well repay anyone who has the requisite material at hand.

THE SHELL BEARING MOLLUSCA OF MICHICAN.*

BY BRYANT WALKER.

U. anodontoides Lea. Cited by De Camp from Monroe County. Also by Call.

* The first installment (land mollusks) of Mr. Walker's catalogue of Michigan mollusks will be found in the June NAUTILUS; the second, aquatic gastropods, in the July number.

U. asperimus Lea. Cited by Miles, Currier and De Camp. The latter in a recent letter says: "I do not believe that it belongs to the State."

U. canadensis Lea. Three Mile Lake, Oakland County, identified by the late Dr. James Lewis.

U. cariosus Say. Cited by Sager and Miles; evidently an error, as the species does not occur so far west. The citation is probably based on some form of *U. occidens* Lea.

U. cælatus Con. Cited by Sager and Miles. In all probability a case of mistaken identity.

U. circulus Lea. Common in southern part of the State. Specimens from the River Rouge are referred to *U. lens* Lea by Dr. De Camp.

U. coccineus Hild. Apparently quite common. A specimen from the Detroit River has a pink nacre.

U. complanatus Say. Northern part of the State. For an account of the re-discovery of this species in this State, see the NAUTILUS III, p. 16 and V, p. 93.

U. cornutus Bar. Cited by Currier and De Camp. Dr. De Camp writes me that this species, formerly common in the Grand River, has entirely disappeared.

U. cuneolus Lea. Cited by De Camp from Monroe County.

U. donaciformis Lea. Mouth of Otter Creek, Monroe County, collected by Jerome Trombly. Cited also by Call.

U. elegans Lea. Southern part of the State. Monroe and Kent counties.

U. ellipsis Lea. Detroit River and Grand Rapids.

U. ellipsiformis Con. The type specimens are stated by Conrad to have been received from Michigan. Were it not for the explicit statement that the beaks were simple, the figure and description would apply to *U. spatulatus* Lea. It would seem possible that it was described from specimens of that form in which the undulations of the beaks, usually quite light, had so nearly disappeared as to escape attention. The species has not been found by recent collectors.

U. fabalis Lea. The River Rouge near Detroit. Cited also by Sager and Miles.

U. gibbosus Bar. Abundant all over the State. A small variety is found in the Detroit river, in which the nacre varies from a deep purple to pure white. There is almost always, however, a trace of purple along the hinge.

U. glans Lea. The Clinton river at Pontiac, where it was first found many years ago, is the only locality known for this species in the State. Its occurrence there I have been successful in verifying.

U. gracilis Bar. Common. Specimens from the River Rouge, Wayne County, are the largest I have ever seen. Those from the Detroit River are much smaller, showing the unfavorable character of their surroundings.

U. iris Say. Cited by Sager, Miles, Currier and De Camp. The latter, however, in a recent letter queries whether the Michigan specimens can be distinguished from *U. novi-eboraci*. Call (Cat. Unionidæ Miss. Valley) credits the species to Michigan.

U. kirtlandianus Lea. Cited by Call from the Grande River (loc. cit.).

U. lævissimus Lea. Cited by Miles, Currier and De Camp.

U. Leibii Lea. Detroit River, identified by Dr. Jas. Lewis; mouth of Otter Creek, Monroe County, collected by Jerome Trombly.

U. latecostatus Lea. Cited by De Camp from the Grand River, Kent County. A specimen received from him agrees in form and in arrangement of the folds with Lea's figure and description. It does not, however, seem to differ from *U. undulatus* except in the more highly developed character of the folds.

U. ligamentinus Lam. Southern part of the State. Cited also by De Camp as *U. crassus* Say. A form with pink nacre occurs on the Grand River (see Lewis, Am. Jour. of Con. IV, 81).

U. luteolus Lam. Very abundant everywhere and exceedingly variable in size, color and shape. De Camp cites *U. siliquoides* Bar., from Grand River as distinct. The nacre is occasionally more or less tinged with pink toward posterior portion.

U. multiradiatus Lea. Appears to occur generally through the southern part of the State. It is very abundant in the Huron River at Ann Arbor, Mich. A dwarfed form occurs in the Detroit River. The female has the edge of the mantle prolonged in long feelers, similar to those figured by Lea (Observations II, pl. xv, fig. 49) in the female of *U. radiatus* Lam.

U. nasutus Say. Occurs all over the State. Specimens from the Detroit River are small and quite thin.

U. negatus Lea. Sheawassee River, Genesee Co., where it was discovered by Dr. M. L. Leach, who writes that the only specimen he found was sent to the Philadelphia Academy of Natural Sciences and was there identified as this species. It is now in the museum

at Bay View, Petoskey, Michigan. Among a large lot of *U. rubiginosus* sent to me by Dr. Leach from the same locality was another specimen, which in the sulcate or rather heavily imbricated character of the surface resembles Lea's description of this species. It is, however, more inflated, and although somewhat eroded, lacks the peculiar beaks described by Lea. If not distinct, it certainly is a very peculiar form of *U. rubiginosus.*

U. novi-eboraci Lea. Abundant everywhere. A form without rays from this state was described as *U. opalinus* by Anthony, but is not considered as distinct by Lea in his last synopsis. Dr. De Camp sends me the following note on Anthony's species. "McNeil found the only specimen of this and sent it to Anthony. It was from Ottawa county, and McNeil says he thought it was a malformed *U. gibbosus* Bar. I have hunted the same stream and never found one."

U. occidens Lea. Generally distributed through the southern part of the State.

U. parvus Bar. River Rouge, Wayne county.

U. penitus Con. Cited by Sager and Miles, probably a mistake, as the species is a southern one.

U. perplexus Lea. Cited by Sager and Miles.

U. phaseolus Hild. Cited in most of the catalogues. Sheboygan County is the most northern locality known to me. Specimens from the Detroit river are smaller than usual, very strongly arcuate and darker colored without spots.

U. plicatus Les. Western part of the State, extending as far north as Muskegon. I have not found this form in the eastern part of the State. Michigan specimen seem to be smaller than those from more southern localities.

U. pressus Lea. Common all over the State.

U. pustulatus Lea. River Rouge, Wayne county.

U. pustulosus Lea. Cited by Sager, Miles and Call.

U. radiatus Lam. Cited by De Camp from Grayling, Crawford County, and as *U. distans* Anth. by Currier and De Camp. Were it not for the occurrence of *U. complantus* Sol., in the northern part of the State, (a species which is usually considered as confined to the Atlantic drainage), I should question whether there was not some mistake in the above citations. Gould in Agassiz "Lake Superior" however, cites this species from the north shore of that lake, and it is quite possible that it has extended from Canada into our northern

borders. I notice that in the NAUTILUS for November, 1891, p. 78, Mr. G. W. Dean says that Anthony's *distans* is the female form of *U. luteolus* Lam. Call (loc. cit.) also refers *U. distans* to *luteolus.* Lea, however, refers it to *radiatus.*

U. rangianus Lea. Fighting Island, Detroit river, and the River Raisin, Monroe Counties, are the only localities where this species has yet been found to my knowledge. Credited to Michigan by Call (loc. cit.)

U. rectus Lam. Not uncommon in the southern part of the State. A form from the Detroit river was described as *U. Sageri* by Conrad and another variety from the Huron river, Livingstone county, as *U. leprosus* by Miles. Specimens from the River Rouge, Wayne county, are fully as wide as any from the Ohio river, but longer, more compressed and not so heavy, the nacre being either white or purple. Detroit river specimens are only about half as large as Rouge river examples, with the nacre tinged with purple toward the hinge, or occasionally of a beautiful salmon color.

U. rubiginosus Lea. Common in the southern part of the State.

U. Schoolcraftii Lea. Not a common species, but cited in nearly all the lists.

U. spatulatus Lea. Very abundant in many localities.

U. subovatus Lea. Cited by Miles, Currier and De Camp. Specimens sent to correspondents as *U. ventricosus* Bar., have been referred by them to this form.

U. subrotundus Lea. Cited by Sager and Miles only. As it has not been found by later collectors it is to be considered a doubtful inhabitant of the state.

U. sulcatus Lea. Detroit river. Specimens from that locality were described as *U. perobliquus* by Conrad.

U. Tappanianus Lea. "Have this from Monroe County, Michigan, that agrees well with Lea's figure and description; but think it the same as siliquoides, only a variety of luteolus. The beaks are eroded on the specimens I have, so that I cannot decide well on the undulations"—De Camp. I know nothing of the occurrence of this species in the State, beyond the above note from Dr. De Camp, which seems to leave the identification somewhat in doubt.

U. tenuissimus Lea. Cited by De Camp from the Grande river. Also by Miles and Currier.

U. trigonus Lea. Cited by De Camp from Black Lake, Ottawa county; also by Miles and Currier.

U. triangularis Lea. Southern part of the State.

U. undulatus Bar. An abundant species in suitable localities in the southern part of the State. Dr. De Camp sends me a specimen which I think should be referred to this species, labelled *U. atrocostatus* with the following note: "This I found in Black Lake, Ottawa county, I think *plicatus* and *latecostatus* distinct; but would hardly say this of *atrocostatus* were it not for finding it only in the still water of the lake, while the other almost universally inhabits rivers with current."

U. ventricosus Bar. Very abundant all over the State and extremely variable. In many localities it attains a large size. Detroit river specimens are small and with comparatively thin shells.

U. verrucosus Bar. Southern part of the State.

(*To be concluded.*)

GOULD'S TYPES OF NASSA AND COLUMBELLA.

BY W. B. MARSHALL.

Tryon has expressed the belief that the types of several species of Nassa and Columbella described by Dr. A. A. Gould were destroyed in the Chicago fire.

Among others he mentions the following:—*Nassa beata*, Loo Choo Is.; *Nassa optata*, Sydney, N. S. W.; *Nassa spurca*, St. Simon's Bay; *Columbella minuscula*, Ousima; *Columbella zonata*, Kagosima.

Referring to the types of Nassa, Tryon said "Most of the above are from the collections of the North Pacific (U. S.) Exploring Expedition; they have not been figured and the type specimens were destroyed in the great Chicago fire. Some of them might be identified with other described species, but it is better not to do so. I think, under the circumstances.[1]

In a note under his description of *Columbella (Seminella) minuscula*, Tryon said "Unknown to me. The types of this, the preceding and following species described by Gould are believed to have been destroyed at Chicago by fire.[2]"

The types of the five species mentioned above were not destroyed. They are now in the collection of the New York State Museum at Albany and are represented as follows:—

[1] Manual of Conchology, (I) iv, p. 63.
[2] Ibid. v, p. 171.

Nassa beata by six specimens.
Nassa optata by one specimen.
Nassa spurca by four specimens.
Columbella minuscula by three specimens.
Columbella zonata by two specimens.

GENERAL NOTES.

Errata. For "*Helix sargenti*" in the May Nautilus, p. 8, read "H. Sargentiana J. & P."; the former name having been used for a species from the Bahamas, belonging to the section *Plagioptycha*.

Those familiar with the life work of the late Dr. Joseph Leidy will be interested to know that the two microscopes which he used for years and from which he obtained such valuable results have been placed in the hands of Messrs. Williams, Brown and Earle, Philadelphia, to sell, by Mrs. Joseph Leidy, and they will be pleased to show them to anyone desiring to see them. They were brought in 1875 and were in almost constant use down to the date of his death, and they show how careful a student he was, in that they are in perfect order and very little soiled or scratched.

The following extract from a letter to the Editor from Dr. W. H. Dall, written upon his recent return from the West Coast, will be of interest to our readers. * * * "My work this time was chiefly stratigraphical. I was able to determine the position of the Wallala beds as continuously conformable with, and below the upper Cretaceous Chico beds. Also to discover that earlier collectors have been mixing the genuine Pliocene and Postpliocene faunas in their collections, the two being often conformable, closely adjacent, and in similar mostly unconsolidated beds.

In mollusks I found that the *Periploma discus* and *Trophon triangulatus* have been found near San Pedro on several occasions lately. At Monterey I got several specimens of *Pedicularia californica* Newcomb, which lives on a red Gorgonian. Monterey as a collecting ground is already greatly injured, and will probably be nearly ruined before long, on account of the Hotel del Monte, the new town of Pacific Grove and the increased population of old Monterey, all the sewage of which is turned into the bay in front of the town. Beaches which formerly would afford several hundred species are now nearly bare, or offensive with stinking black mud. Old collectors will learn this with regret. The San Pedro collectors are very active and enthusiastic and doing good work."

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SHELL COLLECTING AT EASTPORT.

EDWARD W. ROPER.

The August number of the Nautilus was awaiting me on my return from a collecting trip to Eastport, Maine, with Messrs. B. H. Van Vleck and R. T. Jackson, of Boston, and I could fully appreciate Mr. Simpson's excellent article on dredging at Tampa Bay. Eastport is likewise "classic ground" to naturalists, and seldom a year passes that boatman Jerry Sullivan does not have an opportunity to take some ardent collector in his trim sloop. "Uncle" Jerry has been a resident of Eastport over forty years, and has coiled the dredge rope for Agassiz, Verrill, Fewkes and other well-known scientists. He knows the fluctuations of the strong tides, the depth of water, and what is of most consequence, the character of the bottom, which enables him to keep away from rocks which might cause the loss of the dredge.

While not equal to subtropical Florida as a collecting ground, Eastport, for a northern locality, is rich in species and individuals. Our dredgings were in water from fourteen to eighteen fathoms deep, and Mr. Simpson's statement that it was "hard, heavy, wet work," was certainly not overdrawn. Sometimes the dredge came up full of stones and gravel, with which were huge starfishes ten inches across the rays, curious leathery Boltenias, large red shrimps, sponges, such beautiful shells as *Trochus occidentalis*, *Margarita undulata* and *Admete viridula*, and perhaps the long-named

brachiopod, *Terebratulina septentrionalis*. The best brachiopod ground, however, has been ruined, by the dumping upon it of blue clay dredged from Luber Narrows.

The best hauls were made on a moderately soft bottom of mingled mud and sand, which was literally filled with dead and living shells of *Cyclocardia borealis, Astarte undata, Astarte crebricostata, Cardium pinnulatum, Sipho pygmæus, Dentalium striolatum* and many others. Here also were obtained numerous brittle stars, *Ophiopholis*, and the *Astrophyton Agassizii*, which came up clinging to the outside of the net, nearly as often as inside. When the dredge landed in soft mud it brought up such shells as *Leda tenuisulcata, Nucula tenuis, Crenella glandula, Yoldia sapotilla* and *Cryptodon Gouldii*.

Shore collecting at Eastport is sure to prove successful. Ordinary tides rise and fall eighteen feet, and at low tide a large area of shore is uncovered. *Purpura lapillus, Acmæa testudinalis* and the various *Littorinas*, common all along the New England shore, are here of much larger size than in Massachusetts. *Buccinum undatum* is everywhere seen at low water mark, and bunches of its yellow egg cases are fastened to the rocks in abundance. Underneath stones are myraids of crawling things not well known to a conchologist, but nevertheless interesting. In the larger rock pools every stone hides specimens of *Chiton marmoreus* and *Chiton albus, Saxicava rugosa* and *Margarita helicina* are common and the bottom may fairly bristle with the spiny sea urchins.

The enthusiastic collector will understand my pleasure when a critical examination of my gathered treasures revealed about seventy-five species of shells, fifteen of which had not previously been represented in my cabinet. My companions, more interested in other invertebrate forms, were also quite successful. Add to this, the fact that we were in the coolest place in the country, wearing light overcoats many evenings while everybody at home was sweltering in torrid heat, and we may look back to our Eastport trip as favored by fortune and replete with pleasure.

AN IMPORTANT DISCOVERY—A NEW FOSSIL CYPRÆA.

JOHN H. CAMPBELL.

Mr. Homer Squyer of Mingusville, Montana, in collecting during the present summer, additional specimens of cretaceous mollusca in

the Fox Hills Group (upper Missouri) made an exceedingly important "find." Among the species found by him, was a *Cypræa* absolutely new to science, and which may turn out to be the oldest *Cypræa* known to be in existence. The two fossil cypræas from California (*Bayerquei* and *Matthewsonii*) and the *Cypræa* (Mortoni) from the New Jersey marl beds are the only species of the family published as belonging to the cretaceous period; and Prof. Whitfield of New York some time since found a cast of another species (to be described by him) in New Jersey, which he considers to be cretaceous. The stratum (*Tejon group*) in which the two California species were found, is now considered to be tertiary, and the two New Jersey species may possibly turn out to be tertiary also, and in that case, the species just found by Mr. Squyer would be the earliest species of the genus *Cypræa* known. Next month we will describe and figure it more particularly, as we have this month only space enough to note the fact of its discovery, and assign it provisionally a name which we suggest should be *Cypræa Squyerii.*

The type shell of the species (only perfect one found) has been forwarded by Mr. Squyer to the Collection of the American Association of Conchologists.

APPEARANCE OF AN ASIATIC ANODONTA IN THE CHINESE MARKETS OF SAN FRANCISCO.

BY WILLARD M. WOOD.

Several weeks ago, I was invited to take lunch at a Chinese restaurant, with Mr. Sue Locke, an interpreter.

While on the way, this gentleman, who knew I was greatly interested in the study of conchology, informed me that before going to the restaurant, he would show me a new shell which had just been brought from China. Upon this information, I questioned him, and found that it was a fresh-water species.

After passing through a number of narrow streets, we reached a very small Chinese merchandise store. The first object that attracted my attention, was a medium sized fresh-water aquarium containing a number of gold and silver fish.

Upon close examination, I found the bottom to be thickly lined with the species *Paludina Japonica* Mart., and two varieties of

same; and also a species of *Anodonta*, of which I have not, as yet, learned the name.

By my friend acting as interpreter, I discovered that but very few have been sent here. Upon the last steamer from China, several dozen were brought by the sailors, who disposed of them to Chinese merchandise dealers, in Chinatown.

I purchased a few at the price of fifteen cents apiece, and started for the restaurant; but we stopped on the way, once again, as my friend desired to take me to the home of one of his acquaintances to show me another species of *Anodonta*. I was very much astonished upon observing this specimen.

The shells I had been looking at were all less than three inches in length, while this specimen of another species, was almost *six* inches. I tried to secure it but failed. The Chinaman would not part with it. He said, "Me keepee. Him livee heep long time. No die."

As these shells may be bought exceedingly cheap in China, as I was informed, I shall try and have a number sent me.

NOTE ON CYTHEREA CONVEXA SAY.

BY W. H. DALL.

Quite a number of conchologists have referred to Conrad's statement (Medial Tert. Form.) that the well known name of our east coast species is preoccupied by Brongniart, but have hesitated to accept the name *Sayana* proposed by Conrad since no reference to chapter and verse was made by him to substantiate his observation. Having long sought the reference and at last found it, it seems well to put it on record. In Cuvier's "Ossemens fossiles" volume II, pt. 2 contains an essay by Cuvier and Alex. Brongniart entitled "Essai sur la géographie minéralogique des environs de Paris." It contains 278 pages, 4to, with maps and copper plates and was published in 1811. A number of species are figured from the Paris basin, among them *Cytherea convexa*, pl. 8, fig. 7. This shell long remained doubtful but has been practically identified by Benevier and Deshayes with the *Cyrena semistrata* of Deshayes, described in 1831. Say's *C. convexa* was described early in 1824 (Journ. Acad. Nat. Sci. iv, 140). Another *Cytherea convexa* was described by

Hoffmann (Karsten, Arch. 1831, t. 3, p. 385) subsequent to that of Say. Owing to the slight tinge of doubt which still remained, Deshayes' specific has been universally retained for the *Cyrena* except by Herbert and Renevier (Foss. nummul. suppl. p. 59, 1854). All things considered it would seem best to adopt Conrad's name *Sayana* for the well known shell to which it has been applied and which extends its range from Prince Edward's Island to Indianola, Texas, and has existed unchanged since the Miocene.

HYALINIA LÆVIUSCULA N. SP.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

A few years ago while looking over a parcel of fine drift from the Guadalupe river, gathered at New Braunfels, Texas, I found a small *Hyalinia* which was evidently new; but upon the few specimens at hand I did not like to publish it. Now, a few weeks ago, Mr. J. A. Singley had the kindness of forwarding me several thousand small shells picked out of a lot of the same drift materials.[1] Among them there are several dozen specimens of this form, besides nearly as many *Hy. singleyana* Pils., hundreds of *Hy. minuscula* Binn. and a few *Hy. milium* Mse.

Our species is of the size and general appearance of *Hy. minuscula*, for which it doubtless has been taken, but differs from that species in being more depressed. The spire is entirely flat or very little elevated. The whorls are markedly wider, from the nucleus, in specimens of the same size ½–1 less in number, very gradually increasing, and flatter above and below. The surface appears smooth and polished, and only with a strong magnifier radiating lines are seen, much like those of *Hy. radiatula* Gray, but also proportionately much finer. The umbilicus is rather wider in the adult, and the curvature of the whorl to the umbilicus is quite abrupt, appearing almost angular. The shell is colorless, glossy while fresh, and when weathered, appears more milky white, while *minuscula* then is more chalky.

This form is certainly not a variety of *Hy. minuscula* which may be regarded as a "species" at the arbitration of a systematist, but

[1] They are so interesting that a list of them with some notes will be worth publishing in the "NAUTILUS."

entirely distinct. Although the differences from that species seem not striking at first sight, they are well marked after careful comparison, as anyone will be convinced by close examination of the two forms. *Hy. texana* resembles more *Hy. singleyana* Pils., which however is sufficiently different by its much smaller size. The two evidently represent a natural group, and doubtless will show peculiar anatomical characters. It is to be hoped that Mr. Singley or another Texan conchologist will succeed in securing fresh specimens for examination.

Since writing the above, specimens have been received from Hidalgo, Texas, and from Henry County, Indiana. It will probably be found at intermediate localities also.

OBSERVATIONS ON THE HELICES OF NEW ZEALAND.

BY HENRY A. PILSBRY.

The first species of New Zealand land snails made known to science were described many years ago, by Dr. J. E. Gray of the British Museum. A number of forms were described later by Pfeiffer; and most of these were illustrated by Reeve in his big volume on *Helix* in the *Conchologia Iconica*. Reeve took the liberty of renaming the species to which Pfeiffer had given the names of letters of the Greek alphabet. These changes have been adopted by some authors, but as they were wholly unwarranted the propriety of returning to the original Pfeifferian designation is now conceded by most students. The most elaborate contributions to our knowledge of the New Zealand land snails have been made by Prof. Hutton, whose work upon this fauna will only become the more highly valued and appreciated as the subject is more widely known and studied.

Mr. H. Suter has lately made very valuable and substantial additions to New Zealand Malacology. I am indebted to him for numerous specimens and drawings and much useful information still unpublished.

The most prominent element in the New Zealand Helix fauna is the ancient and widely distributed genus PATULA; this is represented by numerous small species belonging to the section *Charopa* of Albers. The world-wide distribution of this type of snail causes us to regard it

as a heritage from so early a fauna that the place of its origin and the paths of its distribution will probably never be known with certainty. There is a peculiar modification of *Patula* found only in New Zealand, to which Hutton has given the sectional name *Thera*.[1] New Zealand has also received Paluloid snails from the *Endodonta* stock, this group being a special development of *Patula* confined to Polynesia. The New Zealand members of the subgenus *Endodonta* belong to two groups of species, one of which contains *P. cryptobidens, P. timandra, P. jessica;* to the other group Mr. Suter has given the name *Maoriana;* these are minute discoidal forms having numerous folds within the aperture. This group can only be considered a mere section of *Endodonta*, the species being closely allied to minute forms of *Endodonta* found in New Caledonia, etc.

Another Helicoid genus represented by numerous species is LAOMA of Gray. This group is characterized by the small, thin, conical or depressed shell with thin simple lip. The jaw is composed of numerous separate squarish plates, being very much like that of our northern genus *Punctum*. The teeth also are peculiar; these composite jawed Helices are probably to be regarded as an excessively ancient and primitive type but their affinities are with *Patula* rather than with the so-called *Goniognatha*. No species known to belong to *Laoma* has been discovered outside of New Zealand. Hutton's genus *Phrixgnathus* must of course be united to *Laoma* but the name may be retained as a section to contain species without teeth in the aperture.

A third genus of New Zealand Helices is also, as far as we now know, confined to those Islands; this is the genus GERONTIA of Hutton. I use that name to comprise snails having the animal and dentition of *Patula* except that the tail is provided with a mucus gland. The jaw is thin and delicate and varies from striated to ribbed. The shell is thin, somewhat translucent and its surface is striated or ribbed, sometimes hairy or occasionally smooth. The spire varies from low conical to nearly flat; and it is a notable fact which has hitherto escaped observation that whatever be the sculpture of the mature shell, the apical or embryonic whorls are spirally striated. This is an unusual feature and recalls to my mind that strange Tasmanian Helix, *Anoglypta launcestonensis*. The snails

[1] The name *Thera* is already in use for a recognized genus of Geometric moths, dating from 1831. As a substitute, *Aeschrodomus* may be used. This section of *Patula* includes *H. alpha* Pfr. and *H. beta* Pfr., the first being the type.

of the genus thus defined have been distributed by New Zealand authors into the following groups which they regard as genera: *Gerontia* Hutt., *Therasia* Hutt., *Thalassia* Alb., *Pysra* Hutt., *Pyrrha* Hutt., *Phenacohelix* Suter, *Patulopsis* Suter, *Amphidoxa* Alb. and *Calymna* Hutt. These sections or subgenera are founded upon various modifications of the shell or jaw, but they have not sufficient distinctness to rank as genera, unless we understand that term in a much more restricted sense than it has been used by the majority of conchologists or zoologists generally. These minor divisions are however natural groups and they are useful if we do not overestimate their importance. The sections or subgenera of this genus may stand as follows, the sequence of names being chronological.[1]

Gerontia Hutt., 1883 (Type *G. pantherina* Hutton.)

Therasia Hutt., 1884, (Type *C. celinde* Gray.)

Calymna Hutt., 1884, + *Amphidoxa* Hutt. not Alb. (Type *C. costulata* Hutt.

Pyrrha Hutt., 1884, (Type *P. cressida* Hutt.)

Phenacohelix Suter, 1891 (Type *H. pilula* Rve.)

Allodiscus Pils., 1892 (Type *H. dimorpha* Pfr.).=*Pysra* Hutt., 1884, non Stal, 1876.

Suteria Pils. 1892 (Type *H. ide* Gray).= *Patulopsis* Suter, 1891, non Strebel, 1879.

Thalassohelix Pils. 1892 (Type *H. zelandiæ* Gray).=*Thalassia* Hutton (? and of Albers,) not *Thalassia* Chevrolat, 1834. (Coleopt.)

It will be noticed that Amphidoxa has been dropped or rather united to Calymna. The true Amphidoxa has not been found elsewhere than upon the island Juan Fernandez and the neighboring South American Coast. I have compared specimens with the New Zealand shells and find that there is not the slightest ground for supposing them congeneric. I am disposed to believe that the New Zealand Thalassias do not belong to the same genus as the Australian *subrugata* Pfr., the type of *Thalassia* Albers. The other departures from the usage of New Zealand authors are sufficiently explained in the above list.

[1] The genus *Phacussa* of Hutton is included by Suter. It may prove that the Zonitoid aspect of the dentition of that form is a secondary modification and not truly Zonitoid. In this case the group will be included among the present forms; otherwise it must remain in Zonitidæ, where Hutton placed it.

I will not comment here upon the genus *Carthæa* of Hutton; its affinities may be with the oriental Bulimuli, but certainly not with the South American group Rhabdotus where it has lately been placed.

In conclusion we find that the faunal relations of New Zealand as far as they are shown by the groups above considered are as follows: (1) with the primitive fauna of Australia still surviving in South Australia and Tasmania it is strongly allied by the predominance of Patula as well as of Paryphanta, Rhytida, etc., and also by the absence of the later elements of the Australian fauna, Hadra, Chloritis, Papuina, Helicina, etc., which are, as Mr. Hedley has shown, a recent influx from the Papua-Moluccan region. (2) from Polynesia it has received the Endodonta-like groups as well as probably Tornatellina and Pupa. The presence of Placostylus shows a third relationship to New Caledonia, Lord Howe Island and more anciently with the Solomon group, but this Bulimoid genus also extends eastward to the Vitian group.

With all deference to the opinions of such eminent zoologists as Prof. Hutton and Dr. von Ihering, I am unable to see that the New Zealand fauna is in any way allied to that of South America, except that in both the Old and the New worlds certain archaic forms have been preserved in these most southern extensions of land.

[Communicated.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

The Association has recently issued a new and revised list of members, under date of July 18, 1892. It contains the names of 175 persons, located in various points of the United States, Canada and Cuba and it is expected before a great while that the conchologists of Mexico, Central and South America, will also be enrolled.

The growth of the Association has been very gratifying and now that the officers have resumed active work, it will no doubt forge ahead very rapidly. The rule requiring the choice of some special subject or branch of conchology, has been a valuable one and a large body of trained specialists will shortly be the result.

It is suggested that it would be an interesting event, if the members would hold a convention at Chicago next summer during the

World's Fair. Doubtless most of the members will visit the Fair and if they could time their visits so as to meet their fellow members and hold a convention, it would enable them to become personally acquainted with each other, besides learning much from the eminent scientists among their number, through the medium of papers prepared for the occasion. The president would be glad to hear from the members upon the subject and if the idea is favorably received, a committee could be appointed to arrange a program. Send in your suggestions, ladies and gentlemen!

Another suggestion is made that a Committee be appointed to classify and revise the nomenclature of the American Unionidæ. Every one, who has paid any attention to this great family, is annoyed at the great number of synonyms that encumber the literature of the subject and as we have several members who are students of the Unionidæ, it would be a good idea to enlist their service in the work. What say you, Messrs. Simpson, Hargrave, Fry, Mead, Lebman, Monell, Nell, Strode, Trombley, the two Wrights, Whittemore, Wheeler, Shepherd, Marshall, Marsh, Gorby, Brady, Vaughan and Witter?

A word about naming shells. Some members like Prof. Dall, Ford, Simpson and Pilsbry are overworked, while others have little opportunity to help their fellow members. The trouble is that the gentlemen named and others like them are all amiable and would like to oblige everybody, but they have an enormous amount of work on hand, and it taxes their time too much to name large lots of miscellaneous shells, which could be distributed around among the members. The writer knows that they would protest against this, if they knew what we are saying about them, for they are too good natured to complain, but nevertheless we would make a suggestion to members, who desire their shells to be named properly. When you get a miscellaneous lot of shells, divide them first into univalves and bivalves. Then, if you can, separate them into land, fresh-water and marine, or as near as you can come to such a division.

Then take your list of members and turn to your index of subjects and find out who are studying the different branches. Then write and ask such specialists, if you will send your shells to them for naming and we venture to say, that they will gladly respond as that is one of the objects of the Association. Let us take a few instances.

1. If you are a beginner and do not know the genera, pick out one

of each genus as near as observation will permit and drop a postal card to the president and he will tell you to whom to send them.

2. If you are further advanced and want the species in any special families named, say *Strombidæ* send to Mr. Ritchie, of Boston; say *Nassidæ* to Mr. Browne, of Framingham, Mass; say *Pupidæ* to Dr. Sterki, of Ohio; say *Olividæ* to Mr. Ford, of Philadelphia; and so on to the end of your list and you can have your whole collection named in a few weeks. The only charge to you will be postage or expressage both ways.

3. If you have any advanced questions to solve, or names to discuss, or other knotty points, then write to men like Prof. Dall, Simpson, Stearns, Pilsbry, Binney, Cooper, Whitfield, Claypole, Schuchert, Sterki, Johnson, Lee, Keep, Yates, Marsh and many others. The Association has enough of trained specialists to answer almost any questions relating to conchology.

The collection of American shells being made by the members of the Association is already a wonderful success. The Academy of Natural Sciences of Philadelphia has given us every facility for caring for the specimens and there are already eight large museum cases almost filled by specimens sent by the members. There are about 1000 species already mounted and labelled and the specimens in most instances are superb, the senders generally taking a pride in sending only the finest shells that can be obained. The placing of fossil species along with the recent ones adds especial value to the collection and makes it, so far as we know, the only zoological collection of the mollusca in America. It is already one of the finest special exhibits of natural history in America, and with the continued zeal and enthusiasm of the members, it is certain to be in a few years, the finest special exhibit in the world.

In sending shells for the collection, members should bear in mind. 1st. That none but members of the Association can contribute specimens. 2nd. None but fine specimens from definite localities will be accepted. 3rd. The exhibit is kept separate and apart from the general collection of the Academy of Natural Sciences. 4th, Every species is labelled with the name and locality of the shells, the name and exact address of the member sending it and the date when it is placed in the collection. 5th. Send all specimens intended for the collection addressed to the president of the Association, care of Academy of Natural Sciences, 19th and Race Sts.,

Philadelphia. He and his brother officers and some of the members assemble there once a week, open the packages, verify the names, label and mount the specimens and place them in the cases.

In the next issue of the NAUTILUS we will begin again the work of acknowledging the receipt of all shells sent during the month by the members.

EXCHANGES.

(Exchange notices of moderate length will be inserted free for subscribers.)

WANTED to exchange British and Tropical Mollusca for U. S. Mollusca of all kinds. Please send lists first and receive mine. None of the commonest species required.—*B. Tomlin, 59 Liverpool Road, Chester, Eng.*

WANTED, *Helices*, in exchange for land and fresh-water shells.—*Edw. G. Vanatta*, 1608 N. 12*th St., Philadelphia, Pa.*

WANTED.—Marine univalves, especially of Mexico, Central and South America. Offered—many specimens, Marine, Land, and Fresh-Water, both U. S. and Foreign.—*F. C. Browne, Framingham, Mass.*

COLLECTORS who desire to dispose of North American Land, Fresh-water and Marine shells for those of *California*, will do *well* by sending their exchange lists to *Williard M. Wood*, 2817 *Clay Street, San Francisco, Cal.*

PACIFIC COAST, marine, land and fresh water shells, for land and fresh water shells of the West Indies and South America, *G. W. Lichtenthaler, Bloomington, Ills.*

FOSSILS from the Silurian, Devonian Subcarboniferous and Carboniferous, to exchange for other fossils, especially of the Cretaceous and Tertiary; send lists and receive mine. *C. S. Hodgson, Albion, Ill.*

CRETACEOUS AND EOCENE FOSSILS, minerals, agates, marine and fresh water shells, to exchange for rare marine shells, cloth-bound books or agates. *Homer Squyer, Mingusville, Mont.*

HERKIMER COUNTY LAND AND FRESH-WATER SHELLS to exchange for desirable species from other localities. Send lists and receive mine. *Albert Baily, Chepachet, N. Y.*

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THE NAUTILUS.

VOL. VI. OCTOBER, 1892. No. 6

ON THE AMNICOLOID GENUS LYOGYRUS, WITH THE DESCRIPTION OF A NEW SPECIES.

BY HENRY A. PILSBRY.

Some years ago the writer had occasion to examine the dentition of the type species of Gill's genus *Lyogyrus*[1], and to show that it is not allied to *Valvata* as supposed by all earlier systematists, as well as by TRYON[2] and by FISCHER[3]; but that it is undoubtedly a member of the family *Amnicolidæ* (Hydrobiidæ of Fischer), and in fact, is not far removed from the genus *Amnicola*. The same results have been independently obtained and fully confirmed by Mr. Charles E. Beecher[4] whose preparations and unpublished drawings of the radula of *Lyogyrus pupoides* show conclusively the true systematic position of this interesting genus.

Lyogyrus may be shortly described as a fresh-water Rissoid having the shell of *Amnicola*[5], the operculum of *Valvata* and the denti-

[1] Pilsbry, in the Conchologists Exchange, vol. ii, p 113, 1888.

[2] Structural and Systematic Conchology, vol. ii, p. 274, 1883.

[3] Manuel de Conchyliologie, p. 735, 1885.

[4] Beecher in *MS. et litt.*

[5] In some localities *L. pupoides* has the entire latter half of the body whorl free from the preceding whorl; but in the great majority of specimens this character is less marked than in the form originally described by Gould; and very often the peristome is actually in contact with the body-whorl for a short distance, as in a normal *Valvata*. The original *V. pupoidea* is an exaggerated and extreme phase of a species varying much in degree of compactness. It is therefore obvious that the character of having the last whorl *free from the preceding* whorl is not a generic or even a constant specific characteristic.

tion of *Bythinella*. To the one species hitherto known we now add the following:

Lyogyrus dalli Pilsbry & Beecher, n. sp.

The shell is umbilicated, smooth, nearly lusterless, of a somewhat transparent horn color. In contour it is globose-turbinate with a short spire and decidedly obtuse apex. The 3½ whorls are quite convex, separated by deep sutures; last whorl ventricose, being well rounded in every part. The aperture is somewhat oblique, almost circular, its posterior angle being indistinct and obtuse. The peristome is continuous and thin, not sinuous, not thickened nor expanded; but the inner lip is a trifle dilated, and adheres to the body-whorl above the umbilicus; the latter being a deep and rather widely open perforation.

Alt. 2·6, diam. 2·5 mm.

The operculum is usually retracted about the quarter of a volution within the mouth; it is a shining, yellowish, thin and corneous circular disk composed of many close whorls, the nucleus being subcentral.

The dentition is practically the same as in *L. pupoides*. The basal denticles are situated higher on the tooth than in *Amnicola*, and only one on each side is well developed, the outer denticle being more or less obsolete, but rather stronger in *L. dalli* than in *pupoides*.

Locality, Wekiva River, Fla. (C. E. Beecher).

This species was obtained in considerable numbers by Mr. Beecher in Wekiva River. It may be recognized by its globose contour, resembling the typical *Amnicola porata* of Say on a small scale; but it is more globose and has a wider umbilicus than any of our other Amnicolas. Of course a glance at the operculum (which is retained in the shell, as usual in this family), tells one at once that the shell is no *Amnicola;* for it is multispiral like the operculum of *Lyogyrus pupoides* Gld., the only species of the genus hitherto known. It will be remembered that Ancey described a *Lyogyrus lehnerti* some years ago, but this turns out to be a monstrosity of *Amnicola limosa* Say.

This species is named in honor of Dr. W. H. Dall, of the Smithsonian Institution, who has contributed so largely to our knowledge of the mollusks of Florida.

Illustrations of shell, operculum and dentition will be given in the Monograph of American Amnicolidæ, now in preparation by Mr. Beecher and the writer.

A FEW ADDITIONAL NOTES ON CREPIDULA.

BY REV. HENRY W. WINKLEY, SACO, ME.

In the August NAUTILUS Mr. Witmer Stone makes the statement concerning *C. fornicata* and *C. plana* that "the tendency towards convex and concave shells has now become a fixed specific character" and the general description of *C. plana* grants to that species an existence on the interiors of other shells and a consequent concave form.

There is a colony of warm water shells in the waters of Northumberland Strait, between Prince Edward's Island and the province of New Brunswick, and this colony is of interest not only for the species which are so cut off from their fellows in the south, but also for a series of interesting Crepidulas. The writer has gathered many specimens of both *C. plana* and *C. fornicata,* but in no case was *C. plana* on the interior, and I recall no concave specimen of either. The specimens of *C. plana* were in some cases far more convex than the average *C. fornicata.* To one who has examined this colony the distinction between these species can have no help from convex or concave characters, yet both species are distinct, and while I have no doubt that they are from a common ancestor, it is impossible to count the dwelling place as responsible for the difference. May I also add that there is in my collection from the region named a specimen of *C. fornicata* which is white, yet bears undoubted characteristics of *C. fornicata.*

THE SHELL BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.

Margaritana complanata Bar. Quite abundant and of large size in the Rouge river. Cited also by Currier and De Camp and no doubt occurs generally over the southern part of the State.

M. deltoidea Lea. Common all over the State. The small size, peculiar as usual to Detroit river specimens, is also characteristic of specimens from Put-in-Bay, Lake Erie.

M. Hildrethiana Lea. River Rouge, Wayne county. Cited also by De Camp from Monroe county, and without locality by Sager and Miles.

M. marginata Say. Common in the southern part of the State. The range toward the north of many of the species commonly met with in the lower portion of the State is quite unknown, and to be determined with any degree of accuracy will require a large amount of extensive and careful field work.

M. rugosa Bar. Common all over the lower peninsula, and sometimes attains considerable size. Detroit river specimens are smaller and thicker than those from the warmer waters of the interior of the State.

M. undulata Say. Cited by Sager, and, no doubt, erroneously.

Anodonta Benedictii Lea. Generally distributed. In the southern part of the State it often attains considerable size. Detroit river specimens as usual are smaller than the average.

A. corpulenta Coop. Cited by De Camp from Berlin, Ottawa county. Immature specimens from the Canal, at Grand Rapids, are referred to this species by Mr. W. B. Marshall.

A. decora Lea. *A. inornata* Anth., described from specimens from Slawson's Lake, Michigan, is referred to this species by Dr. Lea. Cited as *A. inornata* by Currier and De Camp; otherwise does not appear to have been found in the State.

A. edentula Say. Common everywhere and exceedingly variable in size, shape and color.

A. edentula rhombica Anth. This form, described by Anthony, is entitled to varietal rank; but can be too easily connected with the typical form to be considered specifically distinct.

A. ferruginea Lea. Cited by De Camp from the upper peninsula.

A. Ferussaciana Lea. Cited by Sager, Miles, Currier and De Camp.

A. Footiana Lea. Abundant everywhere and in great variety of form. *A. McNielii* of Anthony is considered synonymous by Lea.

A. fluviatilis Dillw. Cited by Miles; also by Sager and Miles, as *A. cataracta* Say. Cited by De Camp from Pentwater, and as *A. cataracta* Say, from the Grand river.

A. Footiana opalina Anth. A most beautiful form, well entitled to distinction as a color variety.

A. fragilis Lam. A very common species and in some of its many varieties one of our most beautiful ones. *A. flava, glandulosa, imbricata, irisans* and *pallida* of Anthony and *A. subcarinata* of Currier are considered as synonyms by Lea. I have no doubt but that some, at least, of these forms are entitled to varietal rank; but

have not sufficient authentic material to justify making such distinction at present.

A. imbecilis Say. Southern part of the State.

A. lacustris Lea. Cited by De Camp from the Grand River.

A. maryatana Lea. Cited as such by De Camp from Pentwater. *A. subinflata* Anth., described from Michigan specimens and *A. Houghtonensis* Currier, from Houghton Lake, Roscommon County, where it still is found in abundance, are referred here as synonyms by Lea.

A. modesta Lea. Originally described from a specimen collected near Kalamazoo; this species has been found in other localities in the southern part of the State. It is closely related to *A. subcylindracea* Lea.

A. ovata Lea. Specimens referred to this species indicate a general range over the State. *A. subangulata* Anth. is considered synonymous by Lea.

A. pepiniana Lea. Cited by Miles. Also by Gould from the north shore of Lake Superior. I am indebted to Dr. De Camp for two specimens from Crooked Lake, Emmet County, which he refers to this species and which agree fairly with Lea's figure. They may, however, be young *A. Footiana*. Another specimen received from him, collected in Houghton Lake, Roscommon County, is probably a half-grown *A. Houghtonensis* Currier.

A. plana Lea. Southern part of the State. This is the largest Anodon we have, and attains considerable magnitude in favorable localities.

A. salmonia Lea. Southern part of the State. Specimens from Maple River, Clinton County, are much larger and heavier than those from Ohio.

A. Schafferiana Lea. Cited by Miles, Currier and De Camp.

A. subcylindracea Lea. Common everywhere and very variable. Some forms seem to exhibit sufficiently persistent peculiarities to justify giving them varietal rank.

A. subgibbosa Anth. Originally described from Black Lake, Holland, Michigan. It also occurs in Mono and Muskegon Lakes at Muskegon, where it is not uncommon.

Sphærium simile Say. Common all over the State.

S. aureum Prime. The types are supposed to have been brought from Lake Superior by the Agassiz expedition. Cited by De Camp from Charlevoix County.

S. solidulum Prime. Houghton Lake, Roscommon County; identified by Dr. James Lewis.

S. striatinum Lam. Very abundant everywhere and equally variable.

S. rhomboideum Say. Appears to be generally but not abundantly distributed through the southern part of the State.

S. fabale Prime. Not common but ranges over the State.

S. occidentale Prime. Quite common.

S. emarginatum Prime. The types are said to have come from the region of Lake Superior. Cited by Currier and De Camp; but apparently on the strength of Prime's statement.

S. flavum Prime. Types from Sault Ste. Marie. Cited by Currier ("Lake Superior") and De Camp.

S. partumeium Prime. Cited by Currier and De Camp from Lake Superior, apparently from the statement given by Prime in his original description. The citation from Houghton Lake in my catalogue of 1879, is erroneous, as the specimen does not agree with examples, supposed to be authentic, received from other localities.

S. sphæricum Anth. Grand Traverse County and Fenton, Michigan, identified by H. A. Pilsbry. Other examples from the latter locality are referred to *S. secure* by E. W. Roper (NAUTILUS, iv, p. 40).

S. transversum Say. Rouge River, Wayne County. Cited by De Camp from Grand River, Kent County.

S. secure Prime. Generally distributed through the State.

S. secure crocea Lewis. Traverse City; see Roper, NAUTILUS, iv, p. 40.

S. truncatum Lind. Generally distributed through the State.

S. vermontanum Prime. Cited by De Camp.

S. rosaceum Prime. Cited by De Camp.

S. stamineum Con. Western part of the State.

S. tenue Prime. Cited by De Camp.

Pisidum virginicum Bgt. Cited in all the lists and apparently distributed over the State.

P. adamsi Prime. Cited by Prime from Holly. Cited also by Currier and De Camp.

P. compressum Prime. Abundant everywhere.

P. abditum Hald. Common everywhere.

P. abditum abyssorum Stimp. Common in Lake Superior at a depth of from 4 to 159 fathoms according to Smith. Originally described from Lake Michigan specimens.

P. rotundatum Prime. "Lake Superior," Prime and Currier; cited also by De Camp.

P. variabile Prime. Apparently ranges over the State as I have it from Wayne, Washtenaw and Roscommon Counties. Cited also by De Camp.

P. ventricosum Prime. Cited by Miles and De Camp.

P. noveboracense Prime. Cited by De Camp from Cass County.

P. æquilaterale Prime. Detroit and Rouge Rivers, Wayne County.

OBSERVATIONS ON THE HELICOID GROUP CHAROPA AND ALLIED FORMS.

BY HENRY A. PILSBRY.

A striking illustration of the vast breadth of the intellectual horizon open before the zoologist is the fact that notwithstanding the large number of scientists, only comparatively rarely do two or several workers publish simultaneously and independently upon absolutely the same aspect or branch of the same special subject. When such a coincidence happened in the times of our predecessors it often gave rise to jealous rivalry, as in the case of Conrad and Lea, and earlier, Say, Rafinesque and Hildreth. In these newer days, cases of simultaneous discoveries in science should, and usually do, lead to an opposite result—to the most helpful and happy friendship and sympathy between naturalists, even though half the globe separates them.

These thoughts are brought to my mind by receiving, in the last Australian mail, proof-sheets of an article by my friend, Charles Hedley, of the Australian Museum, Sydney, N. S. W., entitled "Observations upon the Charopidæ." In this article Mr. Hedley discusses many of the points considered in my "Observations on the Helices of New Zealand," published in the September NAUTILUS; and also extends his notes to the Australian and Polynesian forms. I cannot refrain from quoting from his paper these passages:

"Widespread throughout Australia and Polynesia is a group of land shells which, varying greatly among its members, yet appears clearly distinguishable from other orders by the small size of its species, their cancellated sculpture, in which stout ribs are a promi-

nent feature, flame painting, straight sharp peristome, which describes a convex then a concave sweep on approaching the right insertion, and a projecting semitransparent callus, which buries the sculpture of the whorl on which it encroaches. For this group I provisionally accept the title *Charopidæ*, assigned by Hutton, 1884 (Trans. N. Zealand Inst. xvi, p. 199), extending, however, the limits indicated by that writer. His vague diagnosis runs as follows: 'Animal heliciform with an external shell; tail with a mucus gland.' No type is nominated by the author of the family, and I therefore suggest that the type of *Charopidæ* would naturally be the genus *Charopa* Albers, whose type species is *C. coma* Gray."

Mr. Hedley proceeds to quote the original descriptions of the groups *Charopa* Alb., *Pitys* Beck, *Endodonta* Alb., *Libera* Garr., *Gerontia* Hutt., *Pyrrha* Hutt., *Psyra* Hutt., *Therasia* Hutt., *Thera* Hutt., *Phacussa* Hutt.; mentioning also *Laoma* Gray, *Maoriana* Suter, *Simplicaria* Mouss.; concluding that "From the above review of the genera proposed, it will be seen that the student of the *Charopidæ* is better supplied with divisional names than with definitions." And finally: "To summarise: I would consider that *Patula* has no existence in the Pacific; that the southern species usually referred to that genus are not even of the *Helicidæ* family; that these species can most conveniently be referred to one or other of the genera enumerated above, which genera may be grouped under the subfamily *Charopidæ*, a division of the family *Zonitidæ*."

It will be noticed that Hedley includes in *Charopidæ* most of the forms which in my article were placed as sections under *Patula* and *Gerontia*. The similarity of the shells of these two groups is remarkable, but the information furnished by Hutton upon the animals denied to the New Zealand Patulæ= *Charopa*, a mucus gland upon the tail, and therefore I did not feel justified in uniting the two groups, as I could see no reason for sundering *Charopa* from the genus *Patula*. If, however, *Charopa* and its allies, *Pitys*, *Endodonta*, etc., possess a mucus tail gland, I would unhesitatingly follow Hedley in his separation of *Charopa* from *Patula*, and in grouping it with *Gerontia* (*s. lat.*). Unfortunately only dried specimens are accessible to me, and the evidence furnished by authors is so conflicting that we may well suspend judgment. In the *rank* given to the group by Hedley I find myself unable to fully concur. The presence of a caudal gland and furrows along the foot margin are rarely if ever of more than generic importance.

Very closely allied genera vary in this respect, as in the case of *Arion*, *Ariolimax*, *Prophysaon*, *Anadenus*, *Anadenulus*, etc.; or in the case of *Cionella*, which has no mucus pore, and *Ferussacia*, which possesses this gland. It is hardly needful to multiply instances—the *Zonitidæ* and *Helicidæ* are full of such cases, although many of them are not yet to be found in the conchological text books. The fact seems to be that this caudal gland is simply a local exaggerated development, in a convenient place, of the mucus secreting, glandular structure to be found over nearly the whole upper surface of the foot; and it is likely to be developed independently in different groups. Its presence in different groups is, in my opinion, no proof of genetic connection. I would therefore retain *Charopa*, as well as the forms grouping around *Gerontia*, in the Helicidæ, on account of their dentition, which is not, it seems to me, in any respect Zonitoid.[1]

The connecting links between *Charopa*, *Simplicaria*, *Pitys*, *Maoriana*, *Endodonta* and *Libera* seem to be too numerous to allow us to regard these as separate genera; indeed, they are scarcely of subgeneric rank, unless the examination of the animal reveals differences more fundamental than those now known.

JAPANESE LIMPETS.

BY GEO. W. TAYLOR, VICTORIA, B. C.

The Japanese Patellidæ were tabulated by Mr. Pilsbry in the November number of the NAUTILUS and the table was reproduced with one slight alteration in the Manual of Conchology, vol. 13, p. 131, issued a couple of months later. Strangely enough, Mr. Pilsbry omits from his table in both instances one of the commonest species, namely, *Helcioniscus encosmius* Pilsbry.

A very fine series of this limpet was sent to me a short time since by the Rev. H. Loomis, of Yokohama, and I have also received it from Japan through Messrs W. H. Harrington and Frederick Stearns. The specimens sent by the last named gentlemen were

[1] Some recent authors speak of the "families" *Patulidæ*, *Trochomorphidæ*, *Cochlostylidæ*, etc. It would be well for them to attempt to give a family definition before using such terms.

labelled *amussitata* while genuine *amussitata* came as *toreuma*. I am by no means satisfied in my own mind, however, that the two last named are not one and the same species.

H. encosmius is a very distinct and easily recognized species and varies very little compared with other species of the genus. The figures in Reeve (Conch. Icon. pl. xvi, p. 36) are good and so are all those in the Manual of Conchology (vol. xiii, plate 71).

Mr. Pilsbry in the Manual points out that Reeve applied the name *P. variegata* to two different species. The first described in Conchologia Systematica which appears to equal *rota* of Gmelin and the other in Conchologia Iconica twelve years later, this last being the species Mr. Pilsbry now names *H. encosmius* on the ground that the name *variegata* is preoccupied by Blainville for an unidentified species from Botany Bay.

So far, so good, but Mr. Pilsbry next proceeds to quote as a synonym for his *encosmius*, *H. variegatus* Dall, Amer. Jour. of Conch., vi, p. 277, but this was Reeve's *first variegatus* = *rota* Gmel., as Dall himself surmised. Consequently Dall's localities (which Pilsbry has copied) are clearly incorrect when applied to *encosmius*.

My own impression is that the true *H. encosmius* Pilsbry (=*variegatus* Rve., Conch. Icon., pl. xvi, f. 36) is a species restricted to Japanese and Chinese waters, while the localities "Suez (Fischer) and Red Sea and Gulf of Akaba (Smithsonian Cabinet)," given by Dall and copied into the Manual are correct for *rota* Gmel. (= *variegatus* Rve., Conch. Syst. ii, pl. 136, p. 1).

The remaining locality given in the Manual, viz., "Australia" (Rve.), is also, I think, an error, although I have received from dealers specimens of *encosmius* which they assured me had come from there.

I should have mentioned above that although Dr. Dall in his paper in the American Journal of Conchology is writing evidently of *rota*, not of *encosmius*, he quotes *both* of Reeve's figures as though referring to the same species.

[Communicated.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

Philadelphia, Sept. 28, 1892.

Since the publication of the list of members, there have been admitted to the Association, the following new members:

Mrs. Anita F. Douredoure, 2203 Spring Garden St., Philadelphia, Pa. Subject—*Cypræidæ.*

Miss E. H. Pitman, Box 295, Bristol, R. I. Subject—*Mollusca of New England.*

John W. Palmer, Union League Club, Chicago, Ill. Subject—(not chosen yet).

Warren W. Herman, 149 Emerson St., Boston, Mass. Subject—(not chosen yet).

Wm. H. Weeks, Jr., of Brooklyn, N. Y. has chosen for his subject of special study, the genus *Bulimus.*

In reference to the suggestion of a Convention of the members to be held at Chicago next summer, there have been but few responses as yet. The idea, however, will probably grow, and the members may become interested in it. It is merely a suggestion as yet and of course, will amount to nothing unless the majority of members think it a good thing. Let us hear from the members.

John H. Thomson of New Bedford, Mass., writes: "I like the suggestion of a Congress of Conchologists at the World's Fair next year."

Dr. W. S. Strode is in full accord with the idea as may be seen from the following letter:

LEWISTOWN, Ill., Sept. 7, 1892.

JOHN H. CAMPBELL, ESQ.

Dear Sir.—Your idea suggested in last NAUTILUS to have a Convention during the World's Fair of the "Amer. Asso. Conchologists" is just the thing. I am heartily in favor of it and think it would double the pleasure of a visit to Chicago, at least in my case, to meet the Conchologists face to face, and form an acquaintance that has been hitherto only on paper. Let's have it by all means and then thoroughly discuss, review and possibly revise our loved shells. If this can be done, I would not miss going to the World's Fair, for anything. Yours truly,

W. S. STRODE.

Mrs. M. Burton Williamson, of University P. O., Cal., has prepared and published (by Smithsonian Institution) "An Annotated List of the Shells of San Pedro Bay and Vicinity." It is a valuable list and highly creditable to the author. We have had occasion already, to use it in connection with the collection of the Amer. Association and find it of the greatest value. Several new species of Prof. Dall's are described and figured.

Want of space in this issue of the NAUTILUS will postpone the publication until next month of the acknowledgment of shells received for the "American Collection."

The officers of the Association would like to hear from the members in reference to the purposes, objects and workings of the Association. Suggestions are always received with much pleasure as it aids them in their work. A short resumé of work performed during the past summer by each member would make an interesting article in next NAUTILUS, and we have no doubt that Messrs. Pilsbry and Johnson will gladly throw open its columns for that purpose, as they have already done for this series of articles on the Association. J. H. C.

NOTES AND NEWS.

ERRATA. In the September NAUTILUS, p. 54, in fourth line from top, read "*læviuscula*" in place of "*texana*." There is no *H. texana*.

THE UNIONIDÆ of Spoon River, Fulton Co., Ia., are enumerated and intelligently discussed by Dr. W. S. Strode in the *American Naturalist* for June.

EDITOR NAUTILUS:—I see that in Mr. Cockerell's article in the July number, page 31, "Notes on the North American Species of Succinea," he says, "(17) *S. stretchiana* Bland. I have seen this from *San Francisco, Cal.* (G. W. Michael), sent by Mr. Singley. It seems to be a small species, etc."

During the seven years that I have been collecting in this county I have never found nor have I heard of the above species being found here. The only Succinea to be found in this county, to my knowledge, is *S. oregonensis*. If Mr. Michael or Mr. Singley have any of the said species to spare, will they kindly send to my address a few of them for examination and comparison as also the exact locality whence they were obtained and oblige. I doubt whether Dr. J. G. Cooper and Wm. J. Raymond, two gentlemen who have collected species from this county during the past fifteen years or so have ever found *S. stretchiana* Bld. here.

Yours truly,

Williard M. Wood.

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OF CONCHOLOGISTS.

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ASSOCIATE EDITOR:
C. W. Johnson, Acting Curator Wagner Institute of Science.

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THE NAUTILUS.

VOL. VI. NOVEMBER, 1892. No. 7

CATALOGUE OF THE GENUS PARTULA.

BY W. D. HARTMAN, M. D.

In the following pages is offered an arrangement of the species of the genus *Partula* into groups according to their natural affinities. The number now known is nearly a hundred species. Specimens of nearly all of which I have personally examined, either in my own collection, in the magnificent collection of HARPER PEASE, or in the museums of Paris, Geneva, etc. A description of the animal is also given.

In the next paper the geographical distribution of the leading forms will be discussed.

The animal is terrestrial and viviparous, the body covered by a mantle as in Helix, blunt before, tail long and gradually tapering. Tentacles four, retractile, the upper having the eyes at their tips, collar and labial processes largely developed, no mucous pore, distinct locomotive disc, or parallel furrows alongside of the foot; anal and respiratory orifices in the collar opening on the exterior angle of the shell; organs of generation united, the orifice behind and below the right eye peduncle, matrix ample and occupying much space in the body cavity, often containing several shells of two or three whorls, beside eggs arranged in succession as developed. The embryo shells exhibit spiral rows of fovea beginning at the apex, which after extrusion are continued as spiral striæ. The jaw is very transparent and of a light horn color, slightly arcuate, and more or less attenuated at the ends; the whole anterior surface of the jaw is furnished

with delicate narrow, separated ribs which break the continuity of either margin and run obliquely to the median line where they form a triangular space of ribs of unequal length, which do not reach the lower margin; the number of ribs on each side of the median line, vary in the same species, as well as in the different species, the whole number in each jaw varying from fifty-five to ninety-six; the lingual membrane is broad and the denticles vary in size in the different species some being narrower than others. Shell dextral or sinistral, varying from oblong ovate, to conic ovate, and from solid to thin and translucent or hyaline. Labium often flat, and widely reflected, occasionally revolute or concave, aperture ovate, or auriform, more or less contracted by the wide and often dentate columella. Surface with minute spiral striæ which are punctulate at the apex.

This genus may conveniently be divided into two subgenera: *Partula* (in the restricted sense) and *Diplomorpha*. The species of true Partula I divide into two divisions and thirteen groups, each of which is named for a characteristic species.

I. Auriform Division.

1. Faba Group.

P. faba.

P. faba Martyn.
P. citrina Pse.
P. vittata Pse.
P. radiata Pse.
P. navigatoria Pfr.
P. planilabra Pse.
P. fusca Pse.

2. Auriculata Group.

P. auriculata.

P. auriculata Brod.
P. compacta Pse.
P. thala Garrett.
P. bilineata Pease.

3. Dentifera Group.

P. dentifera.

P. dentifera Pfr.
P. formosa Pse.
P. califera Pfr.
P. imperforata Pse., MS.
P. virginea Pse., MS.

4. Lutea Group.

P. lutea.

P. lutea Lesson.

5. Umbilicata Group.

P. umbilicata.

P. gibba.

P. hebe.

P. umbilicata Pse.
P. gibba Pfr.
P. bicolor Pse.

P. crassilabris Pse.
P. hebe Pfr.

6. Otaheitana Group.

P. otaheitana.

P. otaheitana Brug.
P. vanikorensis Q. & G.
P. mooreana Hartm.
P. lineata Less.
P. suturalis Pfr.
P. garrettii Pse.

P. lignaria Pse.
P. producta Pse.
P. nodosa Pfr.
P. stolida Pse.
P. filosa Pfr.

7. Tæniate Group.

P. carteriensis.

P. tæniata Mörch.
P. micans Pfr.
P. carteriensis Q. & G.
P. attenuata Pse.
P. cinerea Albers.

P. minima Hartm.
P. regularis Hartm.
P. micans Hartm.
P. corneola Hartm.
P. woodlarkiana Hartm.
P. hastula Hartm.
P. clara Pfr.
P. hyalina Mod.
P. Hartmani Smith.
P. flexuosa Hartm.

P. lyrata Mouss.
P. lævigata Pfr.
P. pellucida Pse.
P. simulans Hartm.
P. concinna Pse.
P. Coxi Angas.
P. kubaryi Hartm.
P. pellucida Pse.

(*To be concluded.*)

ANNOTATED LIST OF ALABAMA LAND MOLLUSCA.

BY F. E. SARGENT, WOODVILLE, ALA.

Those familiar with the scarcity of land mollusca in the northern prairie States will appreciate the pleasure which one experiences in coming from Minnesota to Northern Alabama.

With headquarters upon the top of Cumberland Mountain in Jackson Co., it has been my pleasure during the past five months to do some collecting of land mollusca, the result of which may be of interest. The topography of the region is quite varied. The summit of the mountain is comparatively level, rather sandy and covered with timber. About half way down we come to the "benches" which are covered with lime-rocks. In most cases the flat rocks are piled one upon another forming excellent retreats for the smaller forms. At the foot of the mountain the "coves" are level and in places covered with heavy open timber.

The following list is doubtless far from complete, as but a small portion of the region outside of a radius of two miles from Woodville has been searched.

1. Selenites concava Say. Large form. Common, mostly on benches.
2. Zonites fuliginosus Griff. Frequent on benches.
3. Z. lævigatus Pfr. Common on benches.
4. Z. ligerus Say. Large form. Few very fine.
5. Z. intertextus Binn. Few on top.
6. Z. arboreus Say. Common on top. A peculiar form with strong striation above.
7. Z. radiatulus Gray. One example.
8. Z. indentatus Say. Few on benches.
9. Z. wheatleyi Bld. Few on benches.
10. Z. milium Morse. Few between rocks.
11. Z. capsella Gld. Three specimens.
12. Z. Sterkii Dall. Few between rocks.

13. Z. fulvus Drap. Very few on benches.
14. Z. gularis Say. Common on top.
15. Z. internus Say. Very common on top and benches.
16. Z. sp. (?) possibly a new species.
16a. Zonites suppressus Say.
17. Patula alternata mordax Shutt. Frequent on benches.
18. P. Cumberlandiana Lea. Very common on benches.
19. P. perspectiva Say. Common on benches among dead leaves.
20. Helicodiscus lineata Say. Very few on benches.
21. Punctum pygmæum Drap. Few.
22. Helix clausa Say. Few.
23. H. thyroides Say. Common in coves.
24. H. albolabris major Binn. Common on top.
25. H. exoleta Binn. Very common. Large with thick shell, (specimens from Chattanooga, Tenn. have very thin shell.)
26. H. elevata Say. One example. (Beautiful purple-banded var. taken at Chattanooga, Tenn.)
27. H. hirsuta Say. Common on top and benches.
28. H. stenotrema Fér. Common on benches.
29. H. stenotrema var. globosa, n. var. Very common between rocks.
30. H. spinosa Say. Few on benches.
31. H. tridentata Say. Frequent.
32. H. fallax Say. Frequent.
33. H. inflecta Say. Common on top.
34. H. Rugeli Shutt. Scarce on sides under rocks.
35. H. appressa Say. Very large and fine. Common on top and benches.
36. H. Sargentiana J. & P. (sp. nov.) common on rocks.
37. H. obstricta Say. Few on benches and in coves.
38. H. pustuloides Bld. Scarce, only six specimens taken.
39. H. dorfeuilliana Lea. Few in valley.
40. Vallonia perspectiva Sterki. Quite common.
41. Strobila labyrinthica Say. Common under bark.
42. Pupa corticaria Say. Very common.
43. Pupa armifera Say. Two examples in drift.
44. Pupa contracta Say. Common.
45. Pupa curvidens Gld. Common.
46. Pupa curvidens var. gracilis Sterki. Few.
47. Succinea avara (?) Say. Few young.

48. Pomatiopsis lapidaria Say. Common.
49. Carychium exiguum Say var. exile Ad. Few.
50. Helicina orbiculata Say. Common.

ON A REVISION OF THE AMERICAN UNIONIDÆ.

CHAS. T. SIMPSON, WASHINGTON, D. C.

In looking over the September NAUTILUS I was greatly interested in the article on American Association of Conchologists, and heartily agree with the suggestion that the nomenclature of our American Unionidæ needs revising. But to do this properly will be an herculean labor, one that will require time, hard study, and infinite patience, as well as a love for the work.

In the first place most of the literature on the subject is out of print, and much of it, such as the New Harmony Disseminator, Nicholson's Encyclopedia and the like, is so rare as to be practically out of the reach of the average student. It is scattered in a very large number of publications and it will take a considerable amount of careful research to hunt up what has been written on the subject.

Much of this literature is in a terribly confused condition, and there are many disputed points which will require the nicest judgment to satisfactorily settle. Lea read the descriptions of most of his species before scientific societies, claiming that such reading was a bona fide publication, and dated them from that time; Conrad held that no species could be considered published until a description had been printed and circulated. There was a further dispute between them as to dates, Lea holding that of publication of the part or separata in which his descriptions were printed was valid, while Conrad claimed that the date should be given when the whole volume was issued. There are many disputed points between Say and Lea as to their species. Lamarck described his Unionidæ in Animaux sans Vertebres, in Latin, giving each species from ten to fifteen words, without figures, and their identification largely rests on the fact that Dr. Lea afterwards examined the types.

Rafinesque, in his Monograph of the Bivalve Shells of the Ohio River, described and figured a large number of Unionidæ, but the descriptions are brief and unsatisfactory, and the figures are unrecognizable. Certain conchologists have considered his work valid, and

have attempted to identify his shells, others reckon him a quack and claim that he should not be recognized. So far as I know, few or none of his types are in existence, and those that have attempted to identify his species have not been able to agree among themselves. His work, like a tax-title deed, will always leave a cloud on what it was intended to cover.[1]

The material itself forms an exceedingly difficult study, even if the literature was in a satisfactory shape. In North America alone there are in the neighborhood of 800 commonly recognized species of this family, very many of which are extremely close, and nearly all are quite variable. Only a small part of this territory has been at all carefully worked; even in New York, Mr. Wm. Marshall is making the most commendable efforts to record their distribution and find out what species belong to the State, a work which has never yet been done.

In the belt of country in the south known as the "Pine Region," extending from Virginia to beyond the Mississippi, and from the Atlantic and Gulf to the "Hill Country" specific lines among the Unionidæ seem to be almost obliterated, owing largely, perhaps, to the sameness of configuration of the surface, and the uniformity of soil and climate. The British Possessions outside of Canada are for the most part a *terra incognita*, and of the eighty or more nominal species found in Mexico and Central America for the most part we know almost nothing.

We ought to have a knowledge of the anatomy of each species, but that is impossible at present, as few local collections are found over wide areas of our country, and of many forms only the type shell is known. It is enough to thrill the blood of a conchologist to read over the list of those earnest collectors who gathered in the treasures of our streams for Lea, and caught from him his grand enthusiasm; it reminds one of the roll call of some glorious company of soldiers who perished in battle. Anthony, Barrett, Boykin, Buckley, Budd, Clark, Downie, Edgar, Elliott, Emmons, Estabrook, Forshey, Hallenbeck, Jewett, Kirtland, Law, Leconte, Lewis, Lindsley, Lyon, Moores, Neisler, Pybas, Ravenel, Showalter, Spillman, Tait, Tuomey, Vanuxem, White and others of whom I believe not a soul remains living. There is no such corps of collectors of Unionidæ to-day, and it will probably be a long time before there is again.

[1] Rafinesque's types are in the collection of the Academy of Natural Sciences of Philadelphia.—Ed.

I think it is recognized by all who have at all carefully studied the family that Dr. Lea's arrangement, classifying by the presence or absence of a dorsal wing, by sculpture and form, is largely artificial and that some more natural system should be adopted. I believe that the subgenera of Rafinesque, Swainson, Agassiz and others are of little value; it seems to me that an arrangement into groups around certain characteristic and fairly typical species is the most natural that can be made. But while there are large numbers of species among which the strongest relationship is at once apparent there are many others which seem to stand on the border land, and which may as well be placed in one section as another; others, by the characters of certain specimens, appear to have an affinity in one direction and by those of others to belong elsewhere, while there are some nondescripts that do not fit anywhere.

It is my intention to publish some time in the future a Geographic and Systematic Catalogue of the Unionidæ of North America, but it will require years of patient study to prepare it. I also hope at some time to be able to monograph our species.

So far as the South American forms are concerned our material and knowledge are so limited it seems to me it would be almost unwise to attempt at present to do anything with them. Dr. von Ihering is doing excellent work with the Unionidæ of this region and probably has a better understanding of the subject than any man living.

ON THE REVISION OF THE UNIONIDÆ.

BY S. HART WRIGHT AND BERLIN H. WRIGHT, PENN YAN, N. Y.

EDITOR NAUTILUS:—In the September number of THE NAUTILUS, the specialists in Unionidæ are asked to reply to a suggestion that a Committee be appointed to classify and revise the nomenclature of the American Unionidæ.

It is well known that the history of this branch of Conchology is somewhat tainted with personal bitterness and rivalry. The nomenclature is in consequence slightly chaotic; and the synonymy though not more extensive than in the Helices, or in Botany or Ornithology and many other sciences, still needs sifting out. A classification too, still better than Lea's if possible, should be brought for-

ward. The determination of priority of names is a delicate matter in many of our Unionidæ, and it should be settled *officially* by a Committee on lines of equity, rather than by an individual. The same is true also, in discarding a so-called species, and in elevating a synonym to take the first rank.

We have so many species of Unionidæ in North America, that *extremists*, both at home and abroad, look upon the list as one that is over-loaded. A revision by Committee should command general acquiescence. It is not true that *our* nomenclature is burdened like that of Europe.

NOTES AND NEWS.

The address of Mr. John Ford will be in future *Holmes Station, B. & O. R. R., Delaware Co., Pa.*

Dr. W. S. Strode has removed from Bernadotte to Lewistown, Ill., where he will hereafter be permanently located.

Extracts from a letter to the Editor from Dr. Wm. H. Rush, dated *U. S. S. Yantic, Montevideo, Uruguay, March* 11, 1892.— "Since being here I have been able to do very little and have not seen a native land shell. One trip out to the suburbs of Montevideo only yielded some *Helix lactea*. At Buenos Ayres I found the British Cemetery overloaded with *Helix pomatia*. In the swamps around Buenos Ayres I found an *Ampullaria* very common, which is, I think, *australis*, and while up at Palermo Park I found another which I took to be *canaliculata*. Further collecting around the swamps led me to believe that they are the same species. The coloration of the animal varies from a very dark brown to a light mahogany brown; the coloring of the animal also leads to corresponding variation in the color of the shell. Both forms are banded. I saw many in the act of copulation, a light with a dark individual, etc. I tried to preserve a lot of their eggs, but so far I have not met with any success. *Planorbis perigrinus* is also very common; also a species of *Paludestrina*. While walking down the Boca one Sunday afternoon I observed quite a crowd collected around a man standing on the curbstone. Upon approaching I saw that he was opening a bivalve which was being eaten by the people,

just as we eat oysters at home, excepting that he had scalded them first. Before I left I had secured fifty nice specimens, and learned the locality, which is Mar del Plata, a summer resort on the coast of Argentina. I can find no figure of it in d'Orbigny, and from Tryon's Structural and Systematic Conchology I judge it to be a *Lutraria*.

"*Helix lactea* is extremely common in the markets at Buenos Ayres, and I suppose it can be accounted for by the numerous Italians there.

"I want to mention that while coming down here we were boarded when three hundred miles off the coast of Brazil (lat. 30° 09′ 07″ S., long. 45° 36′ 39″ W.) by a swarm of decapods, they flying from the water and landing on our deck and in the chains. Our deck is at least twelve feet above the water, and to get upon it they had to go over the hammock nettings. I secured fifteen specimens of various sizes. There were hundreds more but they were injured so much by their fall as to be of no value. I enclose a hasty traceing from a water-color sketch I made from the largest one."

The Unionidæ of Spoon River, Fulton Co., Ill., are enumerated and intelligently discussed by Dr. W. S. Strode in the *American Naturalist* for June.

The Records of progress in American zoology which the *American Naturalist* publishes from time to time are a total failure as far as mollusks are concerned. The most prominent feature of the record is the omission of important papers. Our contemporary should not judge American malacology by the handful of papers that chance to fall upon his desk.

At the monthly meeting of the Linnean Society of New South Wales, Australia, June 30, 1892, a paper was read entitled "On the Genus Perrieria," by C. Hedley, F. L. S. This paper deals with the rectification of nomenclature; it points out (1) that the type of Coeliaxis is and must remain, not *exigua* Ad. & Ang., as misquoted by Fischer and Tryon, but *layardi* Ad. & Ang., as instituted by the founders; (2) that *exigua* was based in error upon specimens of *australis*; (3) that *australis* and *layardi* are generically incompatible; and (4) that *australis* (= *exigua*) is rightfully comprehended under the genus *Perrieria* Tapparone-Canefri.

An apropos addition to this "clearing up" may be made here. Ancey, in the Conchologist's Exchange, September 1887, p. 39,

proposed the name *Bathyaxis* for *Coeliaxis layardi* Ad. & Ang., which is, as Mr. Hedley has stated, the type of the genus Coeliaxis!

Species identified. From L'Abbé P. A. Bégin, Sherbrooke, Prov. Quebec, Canada. 1, *Goniobasis livescens* Mke, var. 2, *Physa ancillaria* Say. 3, *Limnæa catascopium* Say. 4, *Sphærium striatinum* Lam. 5, *Aplexa hypnorum* Linn. 6, *Planorbis bicarinatus* Say. 7, *Campeloma integra* Say, young specimens. 8, *Physa heterostropha* Say. 9, *Ferussacia subcylindrica* Linn. 10, *Helix albolabris* Say.—*H. A. P.*

Conchologists who do not already possess a copy of Tryon's "Structural and Systematic Conchology" should procure it now. This work is indispensable to the collector who wishes to gain an intelligent idea of the affinities or structure of shells, or to classify a collection. The plates illustrate thousands of species representing all of the genera and subgenera, and the text contains interesting chapters on geographical and geological distribution, structure, classification, etc. It is the most complete text book on the subject in the English language.

Note on Lyogyrus. In our article upon this genus in the October Nautilus, we *intended* to mention all of the described species. Mr. Ford has called our attention to the fact that *Lyogyrus Brownii* Carpenter was omitted,—an oversight naturally very annoying to the author, and of course purely unintentional. This form was described some years ago by Mr. H. F. Carpenter, the well-known writer upon New England and especially Rhode Island shells. It is allied to *L. pupoides* Gld., differing from that species in having the body-whorl *not* free from the preceding, or only slightly so, whilst in the typical *pupoides* it is decidedly separated. The two should be carefully compared with a large mass of material, in order to ascertain whether they intergrade. In both, the spire is very much higher and more conical than in the *L. Dallii*.—*H. A. P.*

Instructions for collecting Mollusks and other useful Hints for the Conchologist, is the title of a pamphlet of fifty-six pages, issued by the U. S. National Museum, and which can be obtained by application to the Director of that Institution. The author, Dr. Wm. H. Dall, has embodied in it a large amount of most useful information on methods of collecting mollusks of all sorts, land, fresh-water and marine, the chapter on dredging and the con-

struction of dredges and other apparatus being especially full and timely. More space should have been given to the methods of preservation of the soft parts and naked mollusks, those in vogue among collectors being very crude and by no means up to the times. Altogether the brochure will be found very useful to active collectors.

Gould's 'North Pacific Exploring Expedition' types.—"Apropos of Mr. Marshall's note in the August Nautilus it may be as well to state that practically all Gould's type specimens of the "Wilkes" and "Ringgold and Rodgers" exploring expeditions are to be found in the National collection. They were of course Government property, but Dr. Gould who described them, for the most part gratuitously, was permitted to retain as remuneration, duplicate specimens for his own collection now at Albany. So of those species of which there were duplicates there may be said to be two sets of types. The uniques are in the National Museum. How Mr. Tryon came to confuse these specimens with those illustrating the mollusk-fauna of the eastern coast of the United States, which, with sundry alcoholic specimens, were destroyed while loaned to Dr. Stimpson at Chicago, I do not know; but that they did not go to Chicago and are at present in my official custody is indubitable.—*Dr. Wm. H. Dall, Curator Dept. Moll., U. S. Nat. Museum, in letter to Ed.*

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A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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THE NAUTILUS.

VOL. VI. DECEMBER, 1892. No. 8

PRELIMINARY DESCRIPTIONS OF NEW MOLLUSCAN FORMS FROM WEST AMERICAN REGIONS, ETC.

BY ROBERT E. C. STEARNS, U. S. NATIONAL MUSEUM.

Uvanilla regina Stearns.

Shell conical, imperforate, black or purplish-black; whorls six to seven, concave, longitudinally somewhat obliquely plicated, the plicæ more or less projecting at the suture, and on the edge of the basal whorl, producing an undulating or crenulated effect. Otherwise sculptured by incremental striæ which traverse the surface and cross the plicæ at right angles. Base concave, radiately, closely and prominently striated, more conspicuous, flattened, coalescing, and sinuously curving at the edge. Commencing at the point where the outer lip joins the body whorl, a shallow groove follows parallel to the periphery and extends toward the aperture, without interrupting the basal sculpture. Aperture obliquely subangulate, black-rimmed and crenulated on the thin edge of the outer lip; nacreous, silvery white toward the edge, bright lustrous golden yellow within and around the umbilical region which latter though deeply pitted is not open. Columella white, calloused, arcuated with a moderately developed rib bounding the umbilical depression, and terminating in a single tubercle. This rib is paralleled by a shallow furrow terminating in a notch just below the tubercle, and by an exterior or outer ridge, part of the way double, of a brilliant orange color; this orange-colored rib is also exteriorly bounded by a shallow

furrow which becomes obsolete toward the aperture. The base of the shell otherwise exhibits faint revolving sculpture.

Dimensions: Altitude, 36 mm., diameter maximum, 34 mm.

The above combines the sculptural features of the Japanese *Chlorostomas* and West Mexican *Uvanillas*, more particularly *U. olivacea*. It is a much handsomer shell than the latter and the most northerly form of the group yet detected on the West Coast.

Chlorostoma gallina Forbes var. **multifilosa** Stearns.

Shell imperforate, large, solid, turbinate globosely conical, elevated; whorls five-and-a-half to six-and-a-half, rounded; suture simple not channeled; apex obtusely pointed, eroded and yellowish; color nearly black; sculpture consisting of numerous spiral or revolving closely set narrow rounded ridges or costæ, alternating with fine incised whitish lines or grooves. Aperture rounded oblique, interior pearly, outer edge rimmed with black and finely crenulated by the projecting ends of the modified whitish grooving. Columella arcuated with two blunt tubercles near the base and a shallow umbilical pit above; base convex.

Dimensions: Altitude, 36 mm., diameter maximum, 34 mm.

The above differs from the typical *gallina* in the absence throughout of any longitudinal markings or sculpture and from Hemphill's var. *tincta* by the lack of the "streak of yellow on the base just below the columellar teeth," also by the conspicuous ribbing and grooving of the entire surface, while in *tincta* as described, "the spiral grooves" are "generally scarcely visible above."

While strongly characterized, the example before me can hardly be assigned to a higher than varietal rank.

The two forms above described were collected by Captain George D. Porter at Guadaloupe Island off the coast of Lower California.

Bulimulus (Pleuropyrgus) Habeli Stearns.

Shell slender, elongated, thin, smooth and shiny, slightly umbilicated, with thirteen to fourteen gradually increasing whorls; whorls slightly convex and longitudinally obtusely plicated; suture distinct; aperture ovate and slightly reflected at the base of the columella. Color ashen white, slightly rufous, with hints of a narrow reddish band beneath the surface glaze.

Dimensions (of largest example): Long, 17·5 mm., diameter, 3·5 mm.

This form is much more slender than *P. chemnitzoides* Fbs., which is well represented by the figures 6a, 6b, plate IX, Proc. Zool. Soc. London, 1850. Aside from the differences in color and sculpture, the surface of Forbes's species is dull in fresh, unrubbed, perfect specimens; the ribs in the latter species are comparatively sharp, thread-like, regular, and somewhat distant, the interspaces being perceptibly wider than the ribs are thick.

Two perfect examples, U. S. Steamer Albatross. The U. S. National Museum also contains specimen collected by Dr. S. Habel several years ago, as well as examples of Forbes' species.

Chatham Island, April 4th, 1888.

A brief description of the foregoing was included in Mr. Dall's paper, "On some types new to the fauna of the Galapagos Islands" in THE NAUTILUS, January, 1892, which also contained descriptions of *Helicina* (*Idesa*) *nesiotica*, *Leptinaria Chathamensis*, *Zonites* (*Hyalinia*) *Baueri*. Reibisch[1] who has recently published a paper on the Fauna of the Galapagos Islands, was probably not aware of Dall's article, as he has apparently redescribed the same forms.

Orchidium Lesliei Stearns.

Form rounded ovate, nearly as broad as long. Dorsum coriaceous, nearly black, shiny, closely irregularly reticulated, with finely incised lineation, and otherwise characterized by somewhat distant flatly rounded papillæ. Underside, dingy yellowish white; margin of mantle wide, nearly smooth; edge of same simple. Anal opening posterior, near edge of mantle and somewhat produced. Respiratory orifice smaller, in median line with and in front of anus. Sexual orifice anterior on the right side, under the edge of the large oval hood or collar. Labial palpi thin, largely expanded.

Charles Island, April 8th, one example; Albemarle Island, April 10th, 1888, two specimens between tide-marks. United States Steamer Albatross.

Littorina (Tectarius) Galapagiensis Stearns.

Shell small, rather solid, ovate-conic, angulated in outline; five to six and a half whorls. Whorls covered with obtusely rounded rather coarse nodules; of these the peripheral series is the strongest, the next preceding less prominent, while the other girdles of nodes are less conspicuous. The peripheral is closely followed by a

[1] Die Concholiologische Fauna der Galapagos-Inseln, von Paul Reibisch, Ges Isis in Dresden, 1892, Abh. 3, 20, pp. 2 plates.

parallel series just below, and the basis is marked by succeeding rows of less prominence. Aperture rounded, ovate, and of a dark chocolate color; columella broad, excavated and produced below. Exterior dull chocolate, brown above, paler below, with still paler nodules.

Dimensions: Altitude, 7·50 mm.; latitude, 5· mm.

While in its general faciēs it much resembles both Antillean and Indo-Pacific forms hitherto described, a comparison with such as most nearly approach it, indicate its non-identity.

James Island, one example, Albatross collection.

Nitidella incerta Stearns.

Shell small, rather solid, acutely ovate, spire elevated, pointed; whorls six to seven, moderately convex, with inconspicuous revolving grooves; upper whorls delicately sculptured with close set rounded longitudinal ribs. Apex obtuse. Aperture nearly half the length of the shell. Outer lip somewhat thickened with five to seven denticles on the inner side. Columella with a single rather prominent plait or tubercle just below the middle. Surface colored by five to six brownish-red bands, alternating with as many white ones on the body whorl.

Dimensions: Length, 6·02; length of aperture, 3; breadth, 2·75 mm.

The above is based on a single perfect example collected by Dr. Habel. It is nearer to Carpenter's *millepunctata* than to any other west coast form, but exhibits color and other differences when placed side by side with that species for comparison.

Galapagos Islands (special island not stated), Dr. Simeon Habel.

Littorina (Tectarius) atyphus Stearns.

Shell small, ovate subturrited, with five whorls; the basal traversed spirally by five principal obtuse keels or ribs, broken into nodules; of these the peripheral are the strongest. Between these and below the lower of the stronger keels, fainter keels are perceptible; the penultimate whorl shows three rows of nodules; of these the two upper are the more prominent, and the lower one is sutural and inconspicuous. Color dull ashen chocolate above, lighter below the periphery of the basal whorl, and mottled below the lowest keel. Aperture rounded ovate, dark colored; columella somewhat excavated and of a pale chocolate tint. Near the base of the columella

the hint of a lightish band may be seen from the edge of the outer lip, inward.

Dimensions: Altitude, 6·25 mm.; latitude, 4· mm.

Manta, Ecuador; collected by Dr. W. H. Jones, United States Navy. This is the first example of the genus detected on the west coast of the American Continent. Published by name only in my list as below.[2]

NOTE ON ACMÆA SACCHARINA (LINNE.)

BY REV. GEO. W. TAYLOR.

I have lately had an opportunity of examining several hundred specimens of *Acmæa saccharina* (Linne) and have come to the conclusion that it is a species that varies comparatively little, and that Mr. Pilsbry is wrong in supposing (see Manual of Conchology, vol. XIII, p. 50) that *A. stellaria* Rve. or *A. octoradiata* Hutton or his own *A. perplexa* are forms of it.

A. saccharina is nearly always distinctly seven rayed. It is common on the Chinese and Japanese coasts but has not been noticed by me in collections from the South Pacific Islands.

A. stellaria Rve. is an eight rayed species. It was described I think from New Holland; my own specimens are from Raratonga and I suppose it to be a species of the South Pacific fauna. Reeve's figures are very good and are copied by Pilsbry, pl. 36. The shell figured by the same author on pl. 61, fig. 65 is also of this species as Mr. Pilsbry surmised (Manual of Conchology, XIII, 99).

Acmæa perplexa Pilsbry seems to me to be abundantly distinct from either of the above named species. It is described as with seven rays but figured with eight which is the correct number.[3] It is a well marked species quite unlike any other *Acmæa* known to me. My specimens were collected in New South Wales from which locality, by the way, I have shells which I refer to *Acmæa marmorata* T.-Woods, which much more nearly resembles *saccharina* than does any specimen of *perplexa* I have seen.

[2] Vide Proc. U. S. Natural Museum, Vol. XIV., p. 326. "List of shells collected on the west coast of South America, principally between latitudes 7° 30′ S., and 8° 49′ N," etc., 1891.

[3] Mr. Taylor is correct in stating that *A. perplexa* is always 8-rayed. The statement that it had but seven was an error.—ED.

If my views are correct the synonymy of the above mentioned species will stand thus:

Acmæa saccharina (Linne). Habitat. China and Japan.
= *lanx* Rve.
= *stellaris* Q. & G. (non Rve.)
= *stella* Lesson.

Acmæa stellaris Rve. (non Q. & G.). Habitat. South Pacific Islands.
= *? octoradiata* Hutton.

Acmæa perplexa Pilsbry. Habitat. Australia.

A NEW LAND SHELL FROM SUMATRA.[1]

BY T. H. ALDRICH.

Nanina (Ariophanta) Dohertyi n. sp. Pl. I, fig. 1, 2.

Shell thin, waxy pellucid, light green, corneous, subimperforate, whorls six, suture slightly margined, impressed, bordered below with a narrow white line, body whorl acutely carinated and ridged, produced at aperture into a flattened spade-like terminal; spire high. Aperture subtriangular, lip reflected strongly, almost completely covering the umbilicus.

Locality, Marang, on Southwest coast of Sumatra.

Note. This shell is doubtfully placed in *Ariophanta*. It resembles *Nanina nasuta* Metcalfe described from Borneo but is much higher, lacks the band of that species, and is differently produced. Received from Wm. Doherty, Esq. who states that when alive it is green with a singularly delicate epidermis, and is arboreal in its habit. Its color makes it almost invisible. Six specimens received.

MESODON ANDREWSI IN MISSOURI.

BY F. A. SAMPSON, SEDALIA, MO.

I send for inspection a shell found by me in St. Francois County in southeast Missouri. While arranging my "Missouri collection"

[1]The illustrations of this species will appear in our next number.

I was struck with the very evident differences between it and the *albolabris* among which I had placed it. The latter all have but little over five whorls, with aperture somewhat contracted by being flattened toward the plane of the base. This shell has the globose form, the rounded aperture, the swollen last whorl, elevated spire, nearly six whorls and all the characteristics of *Mesodon Andrewsi*.

I have before me a specimen received from Mr. Binney with his label showing that it was one of the original lot from which *Andrewsi* was named. The Missouri shell does not materially differ from it in any respect. It is very slightly larger than the North Carolina shell, but not so large or solid as *Andrewsi* from Talula Falls, Georgia, also received from Mr. Binney.

H. Andrewsi is a species of the Cumberland subregion, but other species of that region extend to Missouri, as for instance *Stenotrema labrosum* Bld., and I have no doubt of the correctness of my identification, though it makes an unexpected extension of the habitat of this species.

A VISIT TO WARD'S.

One stormy night in November the Editors and Manager of THE NAUTILUS, and their friend the Vice-President of the American Association of Conchologists, found themselves *en route* for Rochester, N. Y., via the famous Lehigh Valley route. The object of their pilgrimage was to see the largest Natural History Establishment of its kind in America,—PROF. WARD'S. Dawn of the next day found us still far from our journey's end, near Ithaca, and in sight of the classic walls of Cornell College, where NEWCOMB labored so many years. From here, we rode for miles along the beautiful shores of Cayuga Lake, lying like some shining serpent between its dark Devonian and Silurian cliffs. Then breakfast at Seneca; and finally Rochester was reached where we were hospitably received by Prof. Ward, and by his able assistants Messrs. Crump, DeLaney, Baker and Walton. After the usual amount of talk incident upon the meeting of a half-dozen lovers of shells, we started on a tour of inspection, an account of which I will give in the words of one of our number.

"Here is a grand treat, not only for the lover of nature but also of art, for the preparation of objects of natural history (where accuracy

is of the first importance) is indeed a most difficult art, requiring not only a skillful artisan but a scientist as well. If a museum is a collection of prepared specimens, here is a collection of museums in course of preparation. This work is carried on by a force of from forty to fifty in a group of twelve or fourteen large buildings, each devoted to a special department. Our time being limited we could only take a glance at most of the departments. The nearest building to Prof. Ward's residence contains the minerals. A rich collection of meteorites many of them cut in sections. A splendid series, of the many varieties of Quartz. Many interesting forms of the calcite group, including long stalactites, etc., also beautiful specimens of apatite, garnet, malachite, stibnite, etc. In the next building is the geological department; and here we see a specimen which is a treat to both the paleontologist and conchologist: this is the *Cerithium giganteum* from the Paris Basin (eocene) with a perfect aperture. The entire shell is about a foot long, the aperture being expanded like that of a Stromb. A great series of beautiful Ammonites many of them cut and polished, makes the collector of recent shells envy the paleontologist and wish that even one species had survived with its near kinsman the Nautilus. Here, too, are polished slabs showing sun-cracks, the cracks filled with calcite, great slabs four to eight feet in length covered with ripple-marks, while near at hand is the modelling room, where casts and restorations of rare and unique fossils are prepared. A cast of a great *Glyptodon* is in course of construction. In an adjoining room an Irish elk is almost ready for the museum, also a beautiful piece of work for an archæological museum, a model of the 'Serpent Mound' of Ohio.

"The relief-maps represent a great deal of careful and accurate work. This is the class of maps that should be in every museum, college, and school. Prof. Ward is now at work on a large relief-map of New York State for the State exhibit at Chicago. The department of human anatomy contains many examples of exquisite workmanship. Hastily going through the department of taxidermy we note the large mounted elephant with its young, arranged in a very natural and attractive manner; the Indian and American buffalo, side by side; the many species of *Cervidæ;* the large groups of monkeys; superb specimens of the Bengal tiger, male and female. 'The skunk family' in and around their burrow, as natural as life, is both instructive and amusing; and the hundreds of other spec-

imens all show the highest art in taxidermy. Above the mammals are the birds, which our limited time did not permit us to examine. The adjoining room is the osteological department. Specimens from the elephant and hippopotamus to the small rodents and birds show as near perfection as it is possible to obtain in this difficult branch. In the room above this is a large collection of mammalia skulls."

The invertebrates have long claimed a large part of Prof. Ward's attention; and the magnificent series of corals, sponges, echinoderms and crustaceans, attest alike to the fruitfulness of his journeys abroad and to the skill of his workmen at home.

In spite of the attractions of other departments, our time was mainly spent in the "Shell House." The upper story of this building is occupied with a suite of rooms containing Prof. Ward's special collection of invertebrates, the mollusks being arranged in table-cases along the sides and down the middle of two large rooms. The plan of this collection is to have *every genus* represented by characteristic species, and to have the very best specimens of each species that can be obtained. The result is a strikingly beautiful as well as an uncommonly instructive collection. For the past decade or more, Prof. Ward has been giving special attention to the mollusks; and the results of many a journey half round the globe are here shown. Abalones and limpets from California and the northwest coast; Cypræas, Murices, Olivas, Pleurotomas from Panama; Chitons, black Trochi, Cancellarias, etc., from Peru, and limpets of the *Nacella* type from Magellan and Chili, secured during a trip around South America, represent part of the conchological plunder, while bones of the great fossil edentates, and magnificent minerals galore also were secured. The fruits of other journeys are seen in the splendid suites of *Magilus* and *Leptoconchus*, from Mauritius; Strombus, Cones, Cassis, Cypræas, Tridacna, Malleus, Aspergillum and many others from the Indian Ocean; and besides these, desirable species have been selected from the dealers of London, Paris and Berlin. Not the least part of the pleasure in looking over this collection is the fund of anecdote and adventure connected with many specimens secured by Prof. Ward in unfrequented corners of the world.

The work of classifying this great collection has been well performed by Messrs. Crump, DeLaney, Baker and Walton; the last named gentleman having supplied exquisite colored drawings of Nudibranchs and other naked mollusks.

The lower floor of the same building is Prof. Ward's stock of mollusks and invertebrates, one of the largest stocks of shells in the world, classified in labelled drawers, for the convenience of purchasers.

Again we are homeward bound, and are passing the time in showing, by turns, the specimens secured, and praising or criticising one-another's acquisitions; but in one thing we all agree—that the instruction and pleasure of seeing Prof. Ward's shells, and the enjoyment of a day spent in the company of the Professor and his able lieutenants, is well worth a visit to Rochester.

NOTES AND NEWS.

Notes on Unio luteolus Lam. In The Nautilus for November last Mr. Geo. W. Dean in distinguishing this species from *U. radiatus* adduces the uniform color of the nacre of the luteolus. This is as a rule quite true. But specimens from the northern part of this State occasionally have the posterior part of the interior tinged with a very delicate pink. In a quite peculiar local form of small size found by Dr. M. L. Leach in Crystal Lake, Benzie County, the tendency is quite marked and nearly every specimen has the rosy tinge to the nacre. I have never, however, seen a specimen in which the whole of the nacre is thus colored, as occurs in *U. radiatus*. —*Bryant Walker.*

Strobila labyrinthica var. virgo. We have received from Rev. H. W. Winkley of Saco, Me., specimens of a *Strobila* differing from *labyrinthica* in being somewhat larger and more depressed, and translucent-white in color, the lip and lamellæ opaque-white. This variety was found by Mr. Winkley near Sebec Lake, Piscataquis Co., Maine.—*Pilsbry.*

A new color-variety of Helix alauda Fér. Mr. Franciscos E. Blanes has lately found, at Maisi, Cuba, a variety of the above species which he proposes to name var. *Weeksiana*, in honor of Mr. W. H. Weeks, Jr., of Brooklyn, N. Y. The variety has the following characters:

H. alauda color-var. Weeksiana Blanes. Form globose-trochoid with the whorl very strongly deflexed at the mouth. Color pure white with faint oblique pink streaks. Lip bright pink; aperture yellow inside.

Mr. C. A. Whittemore has been elected curator of the museum of the Kent Scientific Institute, one of the oldest scientific societies of Michigan.

Gould's Types and Ms. That which was burnt at Chicago at the big fire was not Gould's *types* of North Pacific Exploring Expedition but his *complete MS.* and notes, absolutely ready for publication. As conchological executor of Dr. Gould, his family gave me his MS. I kept this of North Pacific Expedition in my fireproof till Stimpson begged me to send it to him at Chicago, where it was burnt.—*W. G. Binney.*

Eds. Nautilus: I notice in Mr. Simpson's article on the revision of the American Unionidæ that he believes that not a soul of those of whom he gives a list as collectors in Lea's time remains living. I can say for one that Moores is still living and has been for the past eighty years and five months.—*H. Moores, Columbus, Ohio.*

A new species of Ennea has been dedicated to Rev. A. B. Kendig, of Brooklyn, N. Y.—*E. Kendigiana* Rolle, described in the last number of the German Malacozoological Society's *Nachrichtsblatt.* It is from Senegambia.

A Reprint of the "Conchologists Exchange." Many subscribers to The Nautilus desire to obtain the '*Conchologists Exchange,*' but are unable to do so because it is out of print. The proprietors of The Nautilus have been requested to reprint the *Exchange;* and if a sufficient number of orders for the reprint can be obtained to pay the cost of it, they purpose to issue it in the same form as the present journal, indicating the original pagination. The cost of the reprint will be 75 cents for the two volumes. Those who wish to secure them should address the manager of The Nautilus.

Mr. Hedley wishes it to be noted that he now regards the shell, jointly figured and described (P.L.S.N.S.W. (2), vi, p. 558) by Mr. Musson and himself under the name of *Pupa anodonta,* as a second species of the genus *Heterocyclus,* instituted by Crosse (Journ. de Conch., Vol. xx, 1872, p. 156) for the reception of *H. perroquini* Crosse, from New Caledonia. This genus is considered by Fischer (Manual de Conchyliologie, p. 735) equivalent to *Lyogyrus,* a member of the *Valvatidæ.*

Part 1, of Vol. xv, of the Trans. Royal Soc. of South Australia, lately issued, contains nine plates illustrating Australian Tertiary mollusks described by Prof. R. Tate. There are several very large

and peculiar *Cypræas* and *Conus* among the number. *Trichotropis* and *Scalaria* are also well represented.

New Mollusks of St. Helena. Mr. E. A. Smith of the British Museum has lately described the land shells of the island St. Helena[1], enumerating 27 species, of which 11 are new, and illustrating them with excellent figures. The prominent characters of the fauna are a group of thin *Bulimuli*, the very variable and curious *B. aurisvulpina*, which has been known for over a century, and a group of *Patula*-like shells very similar to the Pacific group *Endodonta*. Besides these, a novel form is described under the name *Tomigerus (?) perexilis*. We can scarcely believe that this belongs to the South American section *Tomigerus*. It seems to be a distinct genus of *Pupidæ* comparable to *Boysidia* and *Hypselostoma*, but distinct from either; and deserving of a separate generic name. We therefore propose to call it Campolæmus. The following characters may be assigned to the group: T. dextrorsa vel sinistrorsa, parva, anfr. ult. valde ascendens, pone labrum constrictus et scrobiculatus; apertura ovata, superne sinu circulari instructa.

EXCHANGES.

Wanted. Works on Land Shells, and rare North American and Foreign Helices. Offered, *Mesodon dentiferus, Sayii, Acanthinula harpa*, etc.—*A. W. Hanham, Bank of British North America, Quebec, Canada.*

Wanted, by purchase or exchange,—good specimens of *Anodonta Ferussaciana* Lea, size immaterial provided beaks are perfect.—*Bryant Walker*, 18 *Moffat Bld, Detroit, Mich.*

To exchange in large or small quantities. *Anodonta suborbiculata* Say and *Anodonta corpulenta* Cooper, also about 40 species of the fine Spoon river Uniones and univalves.—*Dr. W. S. Strode, Lewistown, Ill.*

Exchange. *Unios heterodon* Lea, *lanceolatus* Lea, *Tappanianus* Lea, *Anodonta Williamsii* Lea and *Marg. undulata* Say (pink var.) for other *Unios* not in collection.—*W. T. Farrer, Orange, Va.*

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[1] P. Z. S. Lond. 1892, p. 258.

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OF CONCHOLOGISTS.

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Hugh Fulton has just acquired the grand collection of land and fresh water shells formed by the late MONSIEUR ARTHUR MORELET, probably the largest collection ever formed by an amateur, and containing nearly 10,000 species.

HUGH FULTON (Conchologist),
216 KING'S ROAD, LONDON, S. W.

THE NAUTILUS.

VOL. VI. JANUARY, 1893. No. 9

CATALOGUE OF THE GENUS PARTULA.

BY W. D. HARTMAN, M. D.

(Concluded from November number.)

The genus *Partula* proposed by Baron Férussac in 1819, is restricted to certain small land shells inhabiting the Pacific Islands. The species are found throughout all the groups of these islands, and as far west as New Guinea, which seems their limit. North of the equator they are found at the Caroline, Pelew and Ladrone Islands, and recently the Solomon and New Hebrides Islands have afforded several new species. They have not been found at the Sandwich Islands, New Zealand or Australia. In the Viti group, Mr. Andrew Garrett has discovered that some species are restricted to a single valley, each of which has its specific center, and the range of many species is quite circumscribed. In the Marquesas group some species are found on top of the highest mountains, like many other land shells. The species are either arboreal or terrestrial; hybrids are often found, and they occur between arboreal and terrestrial species. Some hybrids appear to possess a certain degree of fertility, and Mr. Garrett informs us that ten species in the Viti group have produced local varieties. The shells of some species are stout and solid, while others are thin and attenuate. Many species have a tooth-like projection from the inner margin of the peristome giving the aperture an auricular appearance; nearly one half of the species possess this button-like tooth on the parietal wall. Individuals of some species are entirely sinistral while others are

wholly dextral, others again are either dextral and sinistral. They all possess fine spiral striæ, which are decussated by oblique ones giving the surface a waved appearance.

8. Decussatula Group.

P. decussatula.

P. decussatula Pfr.
P. bellata Hartm.
P. magdalina Hartm.

9. Turgida Group.

P. arguta.

P. turgida Pfr.
P. annectens Pse.
P. arguta Pse.
P. minuta Pfr.

10. Rosea Group.

P. rosea.

P. rosea Brod.
P. varia Brod.
P. virgulata Migh.
P. newcombiana Hartm.
P. calypso O. Semp.
P. assimilis Pse.
P. subgonocheila Mouss.

11. Ganymedes Group.

P. ganymedes.

P. ganymedes Pfr.
P. inflata Rve.
P. actor Albers.
P. gonocheila Pfr.
P. repanda Pfr.

II. Buliminoid Division.

12. Guamensis Group.

P. guamensis.

P. guamensis Pfr.
P. abbreviata Mouss.
P. conica Gld.
P. obesa Pse.
P. rufa Less.
P. bulimoides Less.

13. Macgillivrayi Group.

P. macgillivrayi Pfr.
P. caledonica Pfr.
P. carnicola Hartm.
P. paterna Hartm.
P. eximia Hartm.
P. albescens Hartm.
P. alabastrina Pfr.
P. turricula Pse.
P. radiolata Pfr.
P. eburnea Hartm.
P. proxima Hartm.
P. pyramis Hartm.
P. auraniana Hartm.
P. compressa Pfr.

Subgenus *Diplomorpha* Ancey.

The jaw, lingual dentition and genitalia are like *Partula*. The shell does not possess spiral striæ.

D. layardi Braz.
D. coxi Hartm.
D. delatouri Hartm.
D. peasei Cox.

BIFIDARIA: A NEW SUBGENUS OF PUPA.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

In the "Preliminary List of North American Pupidæ"[1] the name of this subgenus has been published, but without further note except that it was in my mss. for a few years. Since then I have obtained other species belonging to it, and became more and more convinced that it is really a natural group, and one of the richest in species.

The forms ranging under it are small, few exceeding 3 mm. of altitude (*P. armifera* Say, *hunana* Grdl.). In shape they are rather various; cylindric, turriculate, conic, ovoid. The color is a lighter or deeper horn, to chestnut on one, to colorless, i. e. whitish or glossy-albino on the other side; in some the coloration is rather constant while others show all these variations, e. g., *P. hordeacea* Gabb. The surface is smooth, polished, or finely striate or, though rarely, with fine ribs; heavily ribbed forms have not come to my notice. A prominent feature lies in the formation of the apertural lamellæ, or plicæ, especially in the one on the parietal wall; it is (with few exceptions) large and more or less distinctly complex, designated in the descriptions as "complex, twisted, bicuspid, bifurcate, emarginate,

[1] The Nautilus, VI, p. 4 and 7.

medio excavata, bifida," etc., and from this character the name of the group has been derived. A close examination of the different forms as well as of immature examples leaves no doubt that it is in fact composed of two different lamellæ, the parietalis (inner, deeper) and supraparietalis (outer, or "angular"), almost separate, side by side in some species (*recondita* Tapp.-Can.), united to almost a simple one in others (most of *P. rupicola* Say), comparatively small in *P. curvidens* Gld. and *pentodon* Say, as here the supraparietal is very small or almost obsolete.

The columellar, equally constant, is generally also somewhat complex. The typical inferior and superior palatal plicæ are always present, though sometimes quite small, and are, as a rule deep seated, never reaching the margin; in some species one or the other of them is in a peculiar oblique position (*P. contracta* Say, *P. recondita*). Generally there is a "tooth" or short fold at the base, in some species present or absent. Additional dentiform or lamelliform plicæ, sometimes very small, but characteristic, are found in many species; one on the parietal wall, between the "parietal" and the columella, constant (*P. armigerella* Reinh.) or inconstant (*P. curvidens* Gld.), one above the upper palatal (*P. armifera* Say) one between the two palatals, inconstant (*P. pentodon* Say, *curvidens* Gld.)

As there is no rule without exceptions—and in natural science these "exceptions" are always highly interesting!—some, or even all, of the typical folds may be absent in species which we have reasons to range under this subgenus (*P. corticaria* Say, *arizonensis* W. G. B.). But in general they are remarkably constant throughout the whole group which extends over North, Central and the northern coast of South America, the West Indies and Bermuda, Eastern Asia, and the islands of the Pacific and Indian Seas. Europe has no recent forms ranging in the group; but there is a fossil one, *P. lamellidens* from the miocene of Tuchoritz, Bohemia, closely allied to our *P. contracta* Say.

The species have been ranged under different subgenera, such as *Pupilla*, *Leucochila*, which neither comprise the whole group, nor are homogeneous in themselves, and which can only gain by the removal of these forms.

There are several distinct groups of which peculiar characters, the range of distribution and the species will be stated in the following.[1]

[1] Conf. Nautilus, VI, p. 4. The species enumerated there will be omitted here; and so will other species which I do not know well enough as to their identity, or their position.

1. Section: *Privatula.* North America.
   Shell cylindric; lamellæ few and small or none.
   Type: *P. corticaria* Say.
2. Section: *Eubifidaria* (Bif. s. str.). America, Polynesia.
   Shell cylindric to turriculate; lamellæ typical.
   Type: *P. hordeacea* Gabb.
   P. barbadensis Küst (W. I.)
   P. grevillei Chitty (W. I.) and numerous others.
   P. exigua Ad. Mauritius.
3. Section: *Boysidia.*[1] Asia, Polynesia.
   Shell conic; aperture very peripheric; lamellæ typical.
   Type: *P. hunana* Grdl. (China.)
   P. strophostoma Mlldff. (Philippines.)
4. Section: *Albinula.* America, Asia, Polynesia.
   Shell oblong or conic-ovate or cylindrical, colorless (contains rather various forms and should be divided in groups.)
   Type: *P. contracta* Say.
   P. armigerella Reinh. (China.)
   P. recondita Tapp.-Can. (Japan.)
   P. pediculus Shuttl. (Japan, Samoa.)
   P. artensis Montrz. (New Caledonia.)
   P. meridionalis Mlldff. (From description; China.)
5. Section: *Vertigopsis.* North America.
   Shell small, vertigo-like, albino; parietal lamellæ rather short and almost simple; palatals near the margin.
   Type: *P. curvidens* Gld.

* * *

So much for the shells. Of the soft parts very little is known as yet. But it is probable that further investigations will prove the relations shown by the shells, which in general yield true evidences of the natural position of their bearers.

---

[1] Bœttger, in v. Mœllendorff (Jahrb. Mal. Ges., 1884, p. 180, 181) proposes the subgeneric name Gredleriella; but Gredler himself sent me specimens with the above. Dr. v. Mœllendorff ranges the group next to Scopelophila (*P. kokeili* Rssm. and *Rossmæssleri* Schm.); but the resemblance is only external, from the conic shape of the shells. In the configuration of the apertural parts and especially the lamellæ it closely resembles *P. contracta* Say, while in Scopelophila they are of quite a different type and wholly marginal.

SHELLS OF WILLIAM'S CAÑON, COLORADO.

BY F. A. SAMPSON, SEDALIA, MO.

Fifteen years ago and again the past summer, I collected shells in William's Cañon at Manitou. On the first visit I asked a specimen dealer if there were any land shells in the vicinity. He said there were no living ones; that he had hunted for specimens over the mountains for years, but had never seen one, though there were dead shells on the side of the mountain near by. I found the dead shells, and also plenty of living *Patula strigosa*, in numbers more abundant than at the latter visit. At that time I had not noticed that Binney's Manual gave *P. hemphilli* as occurring at the same place, else I would have made diligent search for it, though I do not think it will be found there. It seems hardly probable that the young of *strigosa* were mistaken for *hemphilli*, though the shells of four whorls are strongly carinated like *hemphilli*, while the mature shells of five whorls do not show any carina. Cockerell in NAUTILUS, Vol. III, p. 102, thinks the finding of *hemphilli* in the Cañon needs confirmation.

Cockerell states that these shells are typical *cooperi*. They are certainly less elevated than Fig. 152 of Binney's Manual. They are more like Fig. 153 except that they have the two bands shown in Fig. 152, and are not carinated at the commencement of the body whorl. Some of them have the heavy raised callus connecting the extremities of the peristome.

On the rocky ledges by the road side in the Cañon, I gathered a number of small shells, all of them being dead. Had the day not been excessively hot I might probably have found living ones.

The following will show the species and the number found of each:

75. *Patula strigosa cooperi* W. G. B.
9. *Zonites arboreus* Say.
28. *Vallonia pulchella costata* Müller.
18. *Ferussacia subcylindrica* Linn.
5. *Pupa* undetermined.
1. *Pupa hordeacea* Gabb.

POST PLIOCENE SHELLS.

BY O. A. CRANDALL, SEDALIA, MO.

While at Belten, Texas, a short time ago, I discovered great numbers of semi-fossil shells embedded in the clays that were probably formed during the early quarternary period. They are distributed through the clay from two to six feet below the surface and may be seen sticking in the banks at any place along the valley of Nolan Creek where a gully has been washed out. The land is covered with large trees, but the best evidence of the age of the formation is seen in the bed of the creek where the water has worn a channel in the solid limestone rock over which it flows from two to three feet deep. The clay and soil of the valley must have been deposited there before or about the time the creek formed its present channel, many, many hundred years ago. The clay has preserved the shells, in nearly as good condition (except as to color) as when buried; and those found at the greatest depth are in the best condition.

I collected the following species:

Bulimulus dealbatus Say.
Bulimulus schiedianus Pfr.
Zonites friabilis W. G. B.
Zonites—probably an undescribed species.
Patula alternata mordax Shutt.
Helix Rœmeri Pfr. var. umbilicus closed.
Helix Rœmeri Pfr. var. umbilicus closed and toothless.
Helix Texasiana Moricand.
Helix Mooreana W. G. B.
Helix Leaii Ward.
Helix Berlandieriana Moricand.
Helicina orbiculata Say.
Planorbis bicarinata Say.
Planorbis—probably an undescribed species.
Limnea umbilicata Adams.
Physa Halei Lea.
Physa—probably an undescribed species.

ON ACANTHOPLEURA AND ITS SUBGENERA.

BY H. A. PILSBRY.

In studying the species of this abundant group of Chitons, the writer found the scheme of subgenera adopted by the late Dr. Carpenter and published by Dall[1] to be in several respects both insufficient and faulty. These defects are partly due to the fact that Carpenter's studies on this portion of the Chitons were left incomplete by his untimely death, and partly to his rather lax usage in questions of nomenclature.

Acanthopleura, as a whole, is much more closely allied to *Tonicia* than to any other genus. It has no close alliance with the other genera grouped by Carpenter in "Acanthoidea." It agrees with *Tonicia* in having certain areas on the valves studded with minute eyes, which possess a crystalline lens, and are not especially different from lower mollusk eyes generally. *Acanthopleura* differs from *Tonicia* in having these eyes scattered about the bases of the tubercles on the shell, instead of being arranged in radiating series as in *Tonicia*. The eyes are visible under a good hand lens as minute shining black sunken dots or transparent jewel-like raised drops.

Carpenter supposed the West Indian species, *Ch. piceus*, to be the type of *Acanthopleura;* but in Guilding's original paper no species of that group of forms is mentioned by name. A critical review of the subject compels us to accept *Ch. spinosus* Brug. as the type of *Acanthopleura*. The subgenera will stand as follows:

(1) **Acanthopleura** Guild., (restricted.)

Valves somewhat immersed; posterior valve having a very long insertion-plate, cut into numerous teeth by short slits; intermediate valves with one or two slits; sinus smooth; girdle covered with long spines. Type *Ch. spinosus* Brug. *Francisia* Cpr. is a synonym.

The immersion of the valves gives the tail-valve, when detached, the appearance of that of *Katherina tunicata*.

(2) **Maugeria** Gray, (restricted.)

Posterior valve having the pectinated insertion plate, cut into *numerous teeth by slits similar to those of the head-valve.* Median

[1] Proc. U. S. Nat. Mus. 1881, p. 284.

valves 1-slit; *sinus smooth*, not toothed; girdle densely, closely clothed with short calcareous spinelets. Type *Ch. piceus*, of West Indian coasts. This group is *Acanthopleura* of Cpr., not Guilding.

(3) **Amphitomura** (s. g. nov.)

Posterior valve having the insertion-plate very short, with blunt, crenulated edge, interrupted only by *a single mopaloid slit on each side;* median valves 1-slit; sinus smooth; girdle as in s. g. *Maugeria*. Type *Ch. borbonicus* Desh. The tail-valve alone differs from *Maugeria*, but this character is so significant and so strongly developed that the necessity of separating the two subgenera is obvious.

(4) **Mesotomura** (n. nov.)

Posterior valve having the long insertion plate deeply pectinated outside, its edge interrupted only by *a single median-posterior slit;* median valves 1-slit; *sinus denticulate;* girdle sparsely set with spike-like spines. Type *C. echinatum* Barnes. *Corephium* Gray, 1847, not Browne, 1827, is a synonym.

Mention should be made of the curious fact that Gould's *Ch. incanus* and the similar Japanese species *C. japonicus* Lischke, have been by all authors referred to *Acanthopleura*. An examination shows them to differ wholly in the characters of the tail-valve, the *incanus*, etc., having a smooth crescentic callus in place of the insertion-teeth. It therefore belongs in the immediate vicinity of *Onithochiton*, from which it differs in the spiny girdle and rough exterior. The group may be called LIOLOPHURA, *Ch. japonicus* being the type.

A NEW TROCHID FROM JAPAN.

BY H. A. PILSBRY.

Calliostoma Crumpii, n. sp. (pl. I, fig. 3.)

Shell closely resembling *C. argenteonitens* Lischke (Manual of Conchology xi, pl. 63, fig. 32) in contour, color and texture. Differing from that species in the more convex whorls of the spire, the deeply channelled suture, and in sculpture. The body-whorl is rounded, and has a girdle of prominent tubercles at the periphery;

above this is another similar girdle of tubercles, occupying the place of the supra-peripheral series of knobs in *C. argenteonitens*. The deep, channelled suture is bordered by a necklace of beads. The base has six encircling carinæ, like those of *argenteonitens* but more distinctly beaded. The whorls of the spire show the two prominent series of tubercles, and the subsutural row; the beads of the latter sometimes duplicated. Aperture round, oblique, the outer lip slightly expanded; columella and parietal lips regularly arcuate, pearly. Interior silvery, with the reflections of opal. Alt. 31, diam. 26, oblique alt. of aperture 17 mill.

Habitat, Japan.

This is one of the most exquisitely beautiful shells of this family. It differs markedly from *C. argenteonitens* in having a double row of prominent bosses or tubercles. The opaline hues of the nacre shine faintly through the thin, duller whitish outer layer; and the aperture is iridescent with the most intense red and emerald reflections. The specimen is from the collection of Mr. Shelley G. Crump, of Pittsford, N. Y., who is making a special study of *Trochidæ* and *Turbinidæ*, and in whose honor the species is named.

It should be noted that *Trochus moniliferus* Lmk. placed in *Calliostoma* in my monograph of this family in the Manual of Conchology, really belongs to the subgenus *Eutrochus*, but Fischer has instituted a section *Lischkeia* for it. A very fine typical specimen of this species is in the collection of Mr. Crump.

NOTES AND NEWS.

Note on Conulus sterkii Dall.—In Proc. U. S. Nat. Mus. vol. xi, 1888, p. 214, Dall published the description of a n. sp. of *Hyalinia* which he called *H. sterkii*. The description was copied in Nautilus V, p. 10, without a name. The figures represent fairly well the form, except Fig. 3 which shows the spire too high. As Mr. Dall justly supposed, it is a true *Conulus*, which genus has since been confirmed as being distinct from *Hyalinia* by anatomic characters (Dr. v. Ihering and others). In 1891, I examined jaw and radula of a dried specimen, softened, and could not obtain the radula in its totality; now, as there is no hope to have any fresh examples before next year, I publish the general result. The jaw is of nearly exactly

the same shape as that of *Con. fulvus*, only the upper edge more equally rounded, 0,036 mm. wide, while that of *fulvus* measures 0,024. (Specimen from New Philadelphia). Radula: the central tooth is comparatively large, tricuspid; laterals 5, tricuspid, similar to the central; marginals 8 (and probably more) tricuspid, formed as in *C. fulvus*. The shell presents, under the microscope, the same peculiar aspect as that of *fulvus*.—*Sterki, New Philadelphia, O.*

Mr. Hugh Fulton has recently purchased the collection of the late A. Morelet, containing a large number of rare species, especially land shells of Africa and adjacent islands.

Subulina octona, a West Indian snail, has been detected by Mr. Robert Walton, in a green-house at Roxborough, Philadelphia. It seems to be well established there, having been found for several years, in considerable numbers.

Mr. T. Wayland Vaughan, the well-known Texas and Louisiana Conchologist, is studying at Harvard University.

The proposal to reprint the "*Conchologists Exchange*," noticed in our last issue, has met with quite a favorable reception; but the number of subscribers is still insufficient to warrant its publication. The reprinting and price will depend entirely upon the number of subscriptions.

Mr. T. T. Woodruff, of Boston, has recently purchased the collection of Dr. Tryon, of Buffalo (3000 species), which he intends to display in the West.

During the past month, the Conchologists of Philadelphia have had the pleasure of meeting quite a number of the Conchological fraternity from other cities. Early in the month Professor O. B. Johnson, of Seattle, Wash., stopped a few days at Philadelphia and later at Washington, on his way southward. Mr. John Ritchie, Jr., of Boston is in Philadelphia to stay several weeks. Mr. W. J. Raymond, of Oakland, Cal., who is studying Physics at Johns Hopkins University, Baltimore, was with us a day or two, the guest of Mr. Ford. Messrs. Simpson and Henderson, of Washington, D. C., spent a few days with their friends in Philadelphia, and also made a flying trip to New York City, during the holidays. Mr. S., as usual, would admire nothing so much as the dingiest sort of clams. Mr. I. Greegor, of Jacksonville, Fla., was also in the city early in the month. Mr. S. Raymond Roberts spent New Year day at the Academy with his old associates. And finally, our friend

C. E. Beecher, of Yale College Museum, called upon us for only about ten minutes, but we had time to ask, how was his collection of recent *Brachiopoda* coming on? And to hear that he had about 80 out of the 130 or so known species, and is still trying for more.

Dr. J. S. Newberry, who has been professor of Geology and Paleontology in Columbia College, New York City, for twenty-two years, died at New Haven, Conn., Dec. 7, 1892.

EXCHANGES.

Will some of the members of the A. A. of C. kindly send me some living *species of Helix* for my snailery? Zonites not wanted, as they cannot survive the trip across the continent. The favor will be fully appreciated and receipt of specimens acknowledged.—*Willard M. Wood*, 2817 *Clay St., San Francisco, Cal.*

Shells and books to exchange. Send lists, and receive mine.—*Chas. Le R. Wheeler, Damascus, Pa.*

Wanted, by purchase or exchange,—good specimens of *Anodonta Ferussaciana* Lea, size immaterial provided beaks are perfect.—*Bryant Walker*, 18 *Moffat Bld., Detroit, Mich.*

Wanted. Works on Land Shells, and rare North American and Foreign Helices. Offered, *Mesodon dentiferus, Sayii, Acanthinula harpa*, etc.—*A. W. Hanham, Bank of British North America, Quebec, Canada.*

To exchange in large or small quantities. *Anodonta suborbiculata* Say and *Anodonta corpulenta* Cooper, also about 40 species of the fine Spoon river Uniones and univalves.—*Dr. W. S. Strode, Lewistown, Ill.*

Exchange. *Unios heterodon* Lea, *lanceolatus* Lea, *Tappanianus* Lea, *Anodonta Williamsii* Lea and *Marg. undulata* Say (pink var.) for other *Unios* not in my collection.—*W. T. Farrer, Orange, Va.*

$1.00 per Year. ($1.12 to Foreign Countries.) 10cts. a copy.

THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
H. A. Pilsbry, Conservator Conchological Section, Academy of Natural Sciences, Philadelphia.

ASSOCIATE EDITOR:
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THE NAUTILUS.

VOL. VI. FEBRUARY, 1893. No. 10

ADDITIONAL SHELLS FROM THE COAST OF SOUTHERN BRAZIL.

BY WM. H. DALL.

In the NAUTILUS for August, 1891, (V, p. 43) the writer enumerated fifty-five species of marine mollusks from the southern coast of Brazil, mostly collected by Dr. H. v. Ihering, which greatly extended the known range of many familiar species of the eastern coast of the United States. A second list is now presented which considerably enlarges the number of North American and Antillean species known to extend to the region mentioned. Among the land and fresh-water species, *Zonites arboreus* Say was a surprise, as well as a shell which appears not to differ from *Vertigo antivertigo* of Europe.

Columbella lyrata Sby. described from the Bay of Panama had previously been identified by Dunker among species from Santa Caterina, Brazil, and is now sent from Bahia by Safford. *C. terpsichore*, which is a common species in Ceylon and has been received from several Indo-Pacific localities, was reported from Barbados by Cuming and now turns up at Bahia. *Labiosa lineata* Say is a surprise from San Paulo, and so is *Lucinopsis tenuis* Recluz. Several of the Patagonian forms are shown to extend further north than was supposed. The species now reported were chiefly collected by Dr. v. Ihering at San Paulo (S. P.) on the tropic of Capricorn, Montevideo (S. Lat. 35°), Rio Grande do Sul (R. G. S.) in S. Lat. 32°, 30′, Santa Caterina (S. C.) in S. Lat. 26°, and Bahia in S. Lat. 13°

30′. Others were sent by Ensign Safford, U. S. N. from Maldonado, Uruguay, and Bahia. In this connection attention may be called to the list of shells from Fernando Noronha in the Linnean Society's Journal (Zool. xx, pp. 483–503, 1890) by Mr. Edgar A. Smith of the British Museum. This list is not a long one but the same tendency is obvious there, as in our present lists, for the Antillean species to range far southward. Thorough dredging along the coast would doubtless greatly enlarge the lists both of local and Antillean species. In the following list, which is strictly supplementary to that of 1891, some of the species are extended southward from their most southern previously known range nearly three thousand miles! A few species were sent by Dr. W. H. Rush, U. S. N., in May, 1892, which were dredged in Maldonado Bay near the mouth of the La Plata in 3–6 fathoms mud. Those belonging to the northern fauna have been added to make the supplement as complete as possible.

Ostrea æquinoctialis Orb.? worn, R. G. S.
Plicatula ramosa Lam. S. P.
Spondylus croceus (Chemn.) Reeve S. P.
Pecten (Janira) ziczac Lin. S. P.
Margaritiphora radiata Lam. S. P.
Mytilus canaliculus Hanley S. C.
Mytilus exiguus Dkr. S. P.
Arca candida Chemn. S. P.
Arca auriculata Lam. S. P.
Arca incongrua var. brasiliensis Orb. S. C., R. Y. S., S. P.
Arca Orbignyi Kobelt (*rhombea* auct.) S. P.
Leda electa A. Ad. S. P.
Chama arcinella Lin. S. P.
Cardium muricatum Lin. S. P.
Venus subrostrata Lam. S. P.
Venus circinata Lam. S. P.
Venus purpurata Lam. R. G. S.
Venus pectorina Lam. S. P., fossil.
Meretrix rostrata Koch. S. P.
Meretrix texasiana Dall? S. P.
Tivela mactroides Born S. C.
Tivela Iheringi Dall, S. P.
Tivela bicolor Gray, var. S. C.
Lucinopsis tenuis Recluz S. P.
Petricola robusta Sby., Bahia.

Heterodonax bimaculata Lin.
Tagelus gibbus Spgl., Maldonado.
Tellina striatula Lam. S. P.
Macha Cumingiana Dkr. S. P.
Mactra brasiliana Lam. S. P.
Mactra exalbida? worn, S. P.
Mactra cleryana Orb. short var. S. P.; long var. S. C.
Mactra patagonica Orb. R. G. S.
Labiosa lineata Say, S. P.
Corbula caribæa Orb., Maldonado, Rush.
Azara prisca von Martens, (fossil) S. P.
Azara ochreata Hds., Montevideo.
Azara labiata Gray, Montevideo.
Barnea costata Lin. S. P.
Dentalium (? eburneum Desh. worn) S. P.
Cylichnella biplicata Lea, Maldonado, Rush.
Bulla striata Brug. S. P.
Terebra cinerea Born, S. P., Bahia.
Terebra patagonica Orb. S. P.
Olivancillaria auricularia L., Maldonado, R. G. S.
Olivancillaria var.? pallida Swains., M. Bahia.
Olivancillaria contortoplicata Rve. R. G. S.
Olivancillaria Deshayesiana Duclos, R. G. S.
Olivella mutica Say, var. petiolita Duclos, Bahia, S. P.
Scaphella angulata Lam. R. G. S.
Lencozonia ocellata Gmel. Bahia.
Anachis terpsichore Leathes. Bahia.
Anachis lyrata Sby. Bahia.
Columbella mercatoria L. Bahia.
Bullia (Buccinanops) cochlidium Kiener, R. G. S.
Ocinebra Haneti Petit, Montevideo.
Purpura hæmastoma L., Maldonado.
Purpura hæmastoma var. Consul, Lam. R. G. S.
Purpura hæmastoma var. inerma Rve. S. C.
Purpura hæmastoma var. Floridana Conr. S. C., Bahia.
Scala Orbignyi Nyst. R. G. S.
Ianthina exigua Lam. S. P.
Dolium galea Lin. R. G. S.
Simnia deflexa Sby. S. P.
Strombus pugilis L. S. C.

Crepidula aculeata Gmel. R. G. S., Maldonado (Rush.)
Crepidula fornicata Lin. R. G. S.
Sigaretus maculatus Say, S. C.
Acmæa onychina Gld., S. P. Maldonado.
Astralium olfersi Troschel, S. P.
Astralium latispina Phil., S. P.
Omphalius viridulus Gmel. var. brasiliensis Mke. S. P.
Omphalius patagonicus Orb., Maldonado.
Lucapinella adspersa Phil. S. P.
Fissuridea barbadensis var. rosea Gmel. S. P.
Fissuridea patagonica Orb., Maldonado.

DESCRIPTION OF A NEW FORM OF CYPRÆA.

BY JOHN FORD.

Cypræa cruenta Gmel. var. **Greegori** n. var.

Shell depressed, orbicular-oval in form, heavily calloused on the sides and ends. Callus on the sides light salmon in color, with irregular purple-brown spots, having a blotchy appearance. Dorsal surface similar to that of *cruenta*, but lacking the whitish spots typically present in that species. Base spotless, salmon colored, darkest in the interstices. Teeth on outer lip very strong, long and whitish; on inner lip finer, with the exception of the anterior fold, and the adjacent tooth, both of which are very prominent. Space between the anterior fold and the following tooth wide and bright red; posterior teeth of inner lip prolonged outward upon the base.

Dimensions of an average specimen: length 1¼, breadth ⅞ inch.

At a glance this shell appears somewhat related to *C. caurica* Linn., but a careful examination will show that it is entirely distinct from that species, the columella of *caurica* being more concave, and the anterior fold bifid in character; the following tooth of *caurica* also is less prominent, and the form and color of the species altogether different.

This variety differs from *C. cruenta* in being smaller, more rounded in form, entirely lacking spots on the base, and in the peculiar variations of the teeth as described above.

While most students would probably consider var. *Greegori* a distinct species, I am inclined to believe it too closely related to *C.*

cruenta for unquestionable specific distinction. The form has not been known, at least to American collectors, until very recently.

The shell bears the name of my good friend Mr. Isaiah Greegor, of Cuyahoga Falls, Ohio, an untiring collector and student of shells.

THE UNIO MUDDLE.

BY BERLIN H. WRIGHT.

For the past fifteen years my father and myself have been making a study of the family Unionidæ and have brought together something like 700 species. Like many others we have often been greatly perplexed to know where to place a form, being frequently reminded of what a celebrated palæontologist once wrote me regarding a certain gastropod. "It is —— —— but if it had lived a little longer it would have been —— ——"

Several years ago we brought to New York the results of four years hard collecting in South Florida, several bushels of Unios. The perplexing part of the work was commenced, having in hand a figure or description or both of almost every species of the family. All of the shells belonging to the *trossulus* group were placed upon a large table. There was *U. amygdalum* Lea, *lepidus* Gould, *modioliformis* Lea, and *trossulus* Lea. Then with the figures and descriptions of these species before us, we selected a few perfectly typical individuals of each species and undertook the task of dividing the mass of material into four groups corresponding with the above-named species. There were not less than 500 individuals, all cleaned and taken alive. Many days were spent in this work. At the close of the day we would congratulate ourselves that they were correctly divided and the next day on reviewing the work make many changes, until, at last, we gave up in despair and have never dared to send many of them out—only the extreme forms being thus far used.

Then the work of dividing the others in the same manner was undertaken. Typical specimens of various ages and differing sexes of the following species were selected. *U. Buckleyi* Lea, *Jayanus* Lea, *Anthonyi* Lea, *Buddianus* Lea, *aheneus* Lea, *Blandingianus* Lea, *coruscus* Gould (comparison having been made with the type at Albany), *fuscatus* Lea, *Jewettii* Lea, *minor* Lea, *Monroensis* Lea

(here let me say that I have traversed every inch of the shore of *L. Monroe*, dredging in scores of places in the lake and adjacent streams and never found a perfectly typical specimen of this species), *occultus* Lea, and *papyraceus* Gould, the last a specimen loaned from the Newcomb collection. When we finished, thousands of specimens remained that could not well be placed with any of the groups. These were divided into groups and further search made among the various authorities at hand to discover their identity. After eliminating all possible, many interesting forms remained, represented by large numbers of individuals. These we desired to classify and use in exchanges, and names we must have for them. We reasoned thus: The water system of South Florida is in no way connected with Georgia or the States north, the rivers flowing *northward* instead of southward; many of these forms are found in isolated lakes or ponds; large numbers of our known species described by Lea, Conrad and others from a single individual, sometimes a single valve only and rarely more than a small suite being at hand; some of the oldest known species have never been found outside of the original station. These facts justify us in erecting into species such well marked forms as are well represented in these unknown lots. Accordingly this was done and now I am censured for not having given the matter sufficient study. Will those who claim to know, tell us through the NAUTILUS how they arrive at such definite and positive conclusions regarding the genuineness of some of my own and other's species? Will the censor name the exact characteristics of any species? Information of this sort will be hailed with wild delight by all working naturalists, and the name of the discoverer will always be held in grateful remembrance by all lovers of science. We wait.

I believe there can be no safe middle ground. It is either true that there is but one species in the family or else most of the described species must stand as good.

In the U. S. the *Anodon* graduates by imperceptible stages into the *Margaritana* and that into the *Unio*.

We once found a lot of shells in a Pennsylvania stream that bothered us greatly, and the late Dr. Wesley Newcomb pronounced them a cross between *An. undulata* Say, and *U. pressus* Lea. Exteriorly they were the latter but interiorly the former. This suggests the law of hybridization. Distinguished authorities tell us that members of the same species only are fertile; the crosses in some rare cares prov-

ing fertile only for a generation or two. Crosses of *widely differing* forms or races are *very* fertile, but sterility is the law with members of the same family but of *differing species.* Has this test been applied to the family Unionidæ? This seems to be the only way the *true* boundaries of species will be fixed.

It can be asserted without fear of successful contradiction that the members of this family (Unionidæ) are connected in such a manner that it is impossible to draw a limit to any species. The same is true in many other families, recent and fossil, as the Ammonites, snails, sponges, etc. Is it not true that species are mutable, similar conditions and surroundings only yielding like forms? Dr. Newcomb, to settle a dispute, reared from a single pair, five species (?) of Achatinella, their surroundings being varied to produce the desired change. The most cautious recent investigators incline to the theory of mutability of species. The wild dog has descended from the wolf; the domestic dog in all its forms from the wild dog; the domestic cat from the wild cat and the pet guinea-pigs from the wild guinea-pig of Brazil. The domestic forms of these will not pair with ancestors, the new *species* being evolved by differing conditions.

Hence it is that almost every branch of Zoology is burdened with synonymy and is in great confusion. The only practical course for the purpose of classification and study of Natural History is to admit that the principal well characterized forms are species. There is no other course open to us and I have concluded from this process of reasoning that Lea's, Conrad's and others' names, where based on well characterized and differing forms as exhibited in numerous individuals, will have to stand as "good species" in spite of the dictum of individuals. This must be the case or the very foundation of all Natural Science will be destroyed and systemization be impossible. It, therefore behooves us to exercise much caution in our strictures upon the work of others especially where we have not the means of knowing the facilities possessed by the one with whom we differ.

Regarding the classification of the family Unionidæ, I think Dr. Lea's Synopsis a pretty close approximation to what we want. By making some changes it becomes a most useful adjunct to the cabinet. It enables the student to hunt down a species by the process of elimination very expeditiously. I have found some changes and additions expedient. The habitat is entered opposite each species as also a reference to the work, page and plate where it is

described, together with marginal notes of allied species, and all the species described since the last edition was published are entered in their proper place as indicated by the author. A new edition of this work is what we need and not any sweeping change in the arrangement of species.

ON CLEMENTIA SUBDIAPHANA CPR. IN SAN PEDRO BAY.

BY MRS. BURTON WILLIAMSON.

To a collector interested in the geographical distribution of shells, the occurrence of species in distinct areas, is full of interest, even though it may modify his preconceived notions regarding defined limits of certain species.

In Dr. Wm. H. Dall's work, "On some New or Interesting West American Shells," (From Proc. U. S. Nat. Mus., Vol. XIV), he reports the dredging of *Clementia subdiaphana* Cpr., near San Francisco Bay, in 24 fms. The writer says, "the locality whence the specimen was obtained is 600 miles farther south than before reported." The habitat of this species was Vancouver Island and Puget Sound, until Dr. Dall dredged it from Port Etches and southward on the Alaskan coast. A small valve of *Clementia subdiaphana* has recently been collected in San Pedro Bay, by Mrs. Laura H. Trowbridge. Mrs. Trowbridge found it on the beach and sent it to me for identification. As nothing like it had been collected in San Pedro Bay, to my knowledge, I sent the interesting specimen to Dr. Dall for determination. He writes; "looking over some material now on hand, I find young specimens from among my dredgings of 1873 at Catalina Island, and a young one dredged in 1890 off Santa Barbara by the Fish Commission, thus fully confirming the extension southward." This extends the species 500 miles farther south.

DESCRIPTION OF A NEW SPECIES OF BULIMUS.

BY HENRY A. PILSBRY.

Placostylus alienus n. sp.

Shell subcylindrical, with conical spire, very solid, the body-whorl buff, spire tawny. Whorls 4½, convex. Aperture slightly exceeding half the total length of the shell, somewhat oblique, oblong ovate, whitish inside becoming orange toward the lip; per-

istome very heavily calloused within, the callus orange; face of the lip convex, thickened, a little expanded; columella arcuate, reflexed, having a strong fold above the middle, produced by a strong crescentic ridge which encircles the columella immediately behind the reflexed columellar lip. There is a shallow peripheral sulcus upon the latter third of the body-whorl.

Alt. 29, diam. 14½ mill.; alt. of aperture 16½, width 10 mill., inclusive of peristome.

Habitat, New Hebrides.

This species was sent to me by Dr. J. C. Cox of Sydney, N. S. W. Australia. It seems to be quite distinct from any of the described forms. In some characters it resembles the genus *Diplomorpha*, and Dr. Cox suggests that it may belong to that group; but the balance of characters seem to me in favor of *Placostylus*.

Dr. Cox writes "I have only recently received this, to me, quite a new species of shell, and fancy it belongs rather to the genus *Diplomorpha* than to *Bulimus*. I have one specimen with a thin brown epidermis on it, another with the mouth quite pale colored."

NOTES ON THE HELICES OF THE BIOLOGIA CENTRALI-AMERICANA.

BY H. A. PILSBRY.

Dr. von Marten's work on the land shells of Middle America, now in course of publication in Godman and Salvin's magnificent work, Biologia Centrali-Americana, promises to rank as one of the great faunal works of our time. Coming after Crosse and Fischer's elaborate and beautiful volume, it is naturally more complete, and to a great degree supplements the work of the French authors.

The last parts of the Biologia issued contain a portion of the account of the Helices, and as a résumé of the principal points of classification will be of interest to specialists, the writer has ventured to briefly pass them in review.

v. Martens recognizes PATULA as a genus, and in it he includes the sections *Thysanophora* and *Microconus*.

In the genus HELIX the following subgenera are adopted: Acanthinula, Vallonia, Trichodiscina, Practicolella, Arionta, Pomatia, Lysinoë, Oxychona, and Solaropsis. In the subgenus *Acanthinula* are included the minute, conical-globose, narrowly umbilicated forms for which the writer some years ago proposed the name *Ptychopatula*. These forms seem to me to be nothing more than nar-

rowly perforated *Patula*, having no especial relations to *Acanthinula*. The jaw and dentition of *A. granum* Strebel are like the thin-shelled Mexican Patulas, not at all like *Acanthinula*. The subgenus *Trichodiscina* Martens (=*Trichodiscus* Strebel, preoc.) includes the forms grouping around *H. coactiliata* Fér. The very peculiar species *H. macneili* Crosse is included with doubt. If it really belongs here, the name *Averellia* Ancey, 1887 (type *H. macneili*) will take precedence over *Trichodiscina*. In 1889 the writer from a study of specimens collected by Gabb, referred this species to *Cepolis*, although not without doubt.

(*to be continued.*)

NOTES AND NOTICES.

Zonites Sterkii Dall.—I collected this species last Spring near Mt. Lebanon, La., under damp leaves. Dr. Sterki kindly determined the specimens for me.—*T. Wayland Vaughan.*

Notes on the Unionidæ of Florida and the Southeastern States, by Charles T. Simpson, Aid in the Dept. of Mollusks, U. S. National Mus. (32 pp., 26 pl. extract from Proc. U. S. Nat. Mus. XV). In this critical study of the mussels of the southeast drainage we find much to commend. Mr. Simpson discusses their distribution, dividing our area into two regions, one the Mississippi Valley with the Texas and eastern Mexican area as a subregion, the other region comprising the States bordering on the Gulf of Mexico from the Mississippi to Florida, and the Atlantic drainage north to Canada, and also including the St. Lawrence (Great Lake) drainage. In this second region, the specific forms are comparatively few and much less diversified in character than in the Mississippi drainage. One of the most ubiquitous types is *Unio complanatus*, which extends, with variations, throughout the system.

Lea's well-known *classification* of Unio is criticised and designated as "artifical and not in accordance with all the facts of nature;" and in this conclusion we heartily join Mr. Simpson. The arrangement of Lea was a temporary expedient only, and bears about the same relation to a natural system that the arbitrary systematic botany of Linnæus bears to the modern natural system of plants. The species are classified into "groups" by Mr. Simpson; and under each one are given the synonyms, as he understands them, with notes on distribution, and the salient specific characters of each are pointed out. These notes, with the characteristic and generally

very good outline figures of all the species, will be of the greatest use to students of the Uniones of this region. The synonymy given under some species, such as *U. buckleyi, obesus*, etc. is rather alarmingly extensive, and some of his conclusions may cause our Unio-specialists to hurl (verbal) missiles at Mr. S.'s devoted head, "just to show there's no ill feeling;" but the Uniologist must learn to dodge these little things or take them in good part, as they are all incident to the pursuit of a noble science. One new species, *U. subluridus*, is described, from Orange Springs, Volusia Co., Fla. We are sorry to see that by some oversight., Mr. S. has given to Lea the beautiful *Anodonta* of the Florida lakes. It was previously described by Thomas Say, and attains a much larger size than the figures given by Lea or Simpson.—*H. A. P.*

Cypræa chrysalis Kiener.—This species, which apparently has not been seen by Reeve, Sowerby and Roberts, who quote their descriptions from Kiener, is commented upon and described by Melvill in the October number of the *Journal of Conchology*, issued last month. He places the species between *irrorata* Sol. and *quadrimaculata* Gray; and it is considered by him a good species, possessing some of the attributes of the *C. fimbriata* Gmel. var. *microdon* Gray, some of *C.* (*Naria*) *irrorata* Gray, and others of *quadrimaculata* Gray, but differs from all in the produced extremities.

Cypræa amphithales Melv. is also discussed in the same paper, a more perfect specimen than the type having been obtained from Port Elizabeth, S. Africa. This species has the characters of *Cypræovula*, combined with those of "*Luponia*" *algoensis*. It has lately been figured by Sowerby in "The Marine Shells of South Africa," pl. 5, figs. 94–96.

Post Pliocene Shells.—In the January Nautilus, p. 103, a list of semi-fossil shells from Belten, Texas, is given. The *Zonites* mentioned without specific name is a large form of *Z. indentatus* Say. The *Planorbis* is *trivolvis;* and the *Physa* is a very slender form, like a small *Aplexa hypnorum*, or the slenderest sort of a *Ph. pomilia* Con. It seems to be new, but is represented in Mr. Crandall's collection by a single specimen.

Spirula fragilis found on the beach near Gay Head, Mass.—The stranding of *Spirula fragilis* on Nantucket has been described in Binney and Gould's Invertebrates of Massachusetts. It may be of interest as showing the further distribution of this little

cephalopod to note two specimens of the dried internal shells of this species found by Dr. Aug. F. Foerste and myself on the sandy beach between Gay Head light-house and Squibnocket, in August, 1889. The specimens lay on the surface together, above high tide mark, are the only examples which I have seen from the island of Martha's Vineyard. One of the specimens, which I have lately deposited in the collection of the Boston Society of Natural History, was broken anteriorly and the protoconch was missing.—*J. B. Woodworth.*

Cambridge, Mass., January 21st., 1893.

Newspaper Conchology.—The gloriously free daily press of this country does not often discuss scientific matters, but when it does, *facts* are apt to be mangled. The following clipping is not so bad: "It is generally supposed to be a sign of wet weather when snails go about without their shells. One species of snail never takes its walks abroad except when rain is at hand. Some climb trees two days before a down fall, setting upon the upper side of the leaves if a storm is to be of short duration, but taking shelter on the under side if it is to last some time. Still other snails turn yellow before rain, and blue when it is over."

Mr. John Walton, formerly of Ward's Natural Science Establishment, Rochester, N. Y., is now employed as Artist in the Biological Department of the University of Chicago, and his address in future will be *Science Hall, University of Chicago, Chicago, Ill.*

The death of Richard Owen, the great anatomist, has been announced.

Mr. Isaac Martindale, well-known as a botanist and entomologist, and treasurer of the Academy of Natural Sciences of Philadelphia, died at his home in Camden on January 10th.

At the annual election of the Conchological Section Academy Natural Sciences of Philadelphia, the following officers were chosen: Director, W. S. W. Ruschenberger; Vice Director, John Ford; Secretary, Edw. J. Nolan; Treasurer, S. Raymond Roberts; Conservator, Henry A. Pilsbry.

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THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
H. A. Pilsbry, Conservator Conchological Section, Academy of Natural Sciences, Philadelphia.
ASSOCIATE EDITOR:
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THE NAUTILUS.

VOL. VI. MARCH, 1893. No. 11

OBSERVATIONS ON THE HELICES OF NEW ZEALAND.

BY DR. H. V. IHERING.

Upon this matter Mr. Pilsbry has communicated two papers in the NAUTILUS for 1892 (pp. 54–57 and 67–69). A curious confirmation of his observations upon simultaneous discoveries in science is the fact that I published the same ideas as Mr. Pilsbry, at the same time, in a paper finished by me in 1891.[1] In that paper, p. 487, I stated that:

Maoriana Suter is synonymous with *Strobila*;

Phrixgnathus Hutton is synonymous with *Punctum*.

And that these genera, and also the (so-called) *Microphysa*, and the other allied New Zealand genera are *Patulidæ*. Mr. Pilsbry having made the same disposition of them in his paper, p. 55.

Mr. Pilsbry, again, (p. 69) has offered the same opinion upon the systematic value of the mucous pore as I have done on p. 401 of my paper, and has even used the same examples, to which I added *Zonites* with, and *Zonitoides* without mucous pore. I trust that Messrs Hedley and Suter will recognize from the study of my paper, that the ideas of Semper on the *Zonitidæ* are extremely erroneous; and that they will therefore agree with Pilsbry and myself, in discarding Semper's conclusions.

[1] H. v. Ihering Morphologie und Systematik des Genitalapparates von Helix, Leipzig, 1892. Zeitschr. f. wiss. Zoolog. Bd. 54, p. 386–420 and Taf. 18, 19.

I agree completely with Mr. Pilsbry in regarding the numerous "genera" of the *Charopidæ* instituted by our Australasian *confrères* as subgenera of *Patula*. Thus *Patula* is a completely cosmopolitan genus. The true *Helicidæ* do not exist in New Zealand. In my paper already cited, I have restricted the family *Helicidæ* (p. 426) to the genera having a dart sack or sacks (belogonous). These are the following:

1. *Xerophila* (Held.) v. Ih.
2. *Fruticicola* (Held.) v. Ih.
3. *Helix* (L.) v. Ih.
4. *Campylæa* (Beck) v. Ih.
5. *Gonostoma* Held.
6. *Dorcasia* (Gray) v. Ih.
7. *Cochlostyla* Fér.

The genus *Helix* comprises *Tachea*, *Pomatia*, *Iberus*, *Macularia*. The Helices of U. S. are not belogonous and form my genus *Neohelix* (p. 482), corresponding in general to what Mr. Pilsbry called *Polygyra*. But as Mr. Pilsbry's genus also included *Gonostoma* and *Vallonia*, these genera are not synonymous. It is not at all convenient to give the name *Polygyra* to the section *Polygyra* and also to a *greater group* which each zoologist defines in a different manner. The genus *Neohelix* is a very natural one, but its systematic position will not be evident until the origin and affinities of the genus are demonstrated, and this, I believe, will be made out by farther anatomical and embryological studies.

I provisionally give the name *Parahelix* (p. 492) to all Helices which are not *Helicidæ* or *Neohelix*. The anatomy of the *Parahelix* group is almost unknown.

The family of *Helicidæ* is not represented (excepting the imported genera) in the U. S. east of the Rocky Mountains; and there seems no paleontological evidence that they formerly existed there. The genus *Campylæa* extends from Europe and Asia to California, Central America and eastern South America. These South American Helices without doubt are pliocene immigrants. No *Helicidæ* are found in Australia, New Zealand or Polynesia. Nor in Chile and La Plata tertiary beds no true *Helicidæ* occur. There can be no doubt that the family *Helicidæ* is a palæarctic one, which in tertiary time extended to America.

I agree in general with the observations made by Mr. Pilsbry on the relations of the New Zealand fauna; but I believe that Mr.

Pilsbry did not take into consideration the disposition of some cosmopolitan genera in certain points. Thus *Pupa* is represented but by one species in New Zealand, and *Succinea* not at all; and notwithstanding there are perhaps no two genera of Nephropneusta more cosmopolitan than *Pupa* and *Succinea*. The genera *Physa*, *Planorbis*, *Limnæa*, *Ancylus* (with *Latia*), *Cyclas*, *Pisidium*, *Neritina*, *Helicina*, *Melania* are cosmopolitan but have disappeared with time in some localities. Some genera now confined to one locality were once cosmopolitan like *Partula*, now Polynesian only, but found in the European eocene by Oppenheim and in the Florida miocene by Heilprin. Other genera may have been more restricted in distribution as I presume with the *Chilinas* of Archiplata, which shall be discovered I assume some day in mesozoic beds of Australia or New Zealand. It is to be studied which are the genera or families of Nephropneusta which once spread cosmopolitan over the globe. I can name *Patula*, *Succinea*, *Pupa* and perhaps some *Zonitidæ*, *Bulimulus* with *Partula*, *Bulimus* with allied genera.

If we compare the molluscan fauna of South America and New Zealand, it is evident that it is impossible to expect to see the relations as very close. Both have undergone enormous modification since they were disconnected in the beginning of the tertiary period according to the theories of Mr. Hutton and myself. The archiplatan province of South America has in the later tertiary received immigrants from North and Central America (such as *Campylæa*) and from the Archamazonian province (as *Streptaxis*, *Ampullaria*, *Glabaris*, etc.). New Zealand on the other hand, received immigrants from the adajacent islands and from Australia, and this Australian element is perhaps in part Asiastic. The genera common to Archiplata and New Zealand thus may be very few. Anyone who studies land shells from Archiplata, excluding the northern immigrants will be astonished by the extreme poverty of the fauna. And what remain as presumably autochthonous, are such genera as *Pupa*, *Succinea*, *Patula*, *Bulimulus*, *Bulimus*.

I am quite aware that these facts are not sufficient to prove the ancient connection of Archiplata and New Zealand; but it should also be stated that no facts contradictory to such connection have been adduced. The argument can be conclusive only when we know better the paleontological history of the fauna. What is known to-day is in favor of my theory, as I have demonstrated in relation to the fresh-water shells. Also the fossil marine shells will probably

give the same result. Is it not a curious fact, that in the Patagonian eocene occurs a true *Struthiolaria*, a genus not elsewhere encountered either recent or fossil but in New Zealand? All these questions can only progress when the relations of the fossil faunas of Australia and New Zealand are compared with those of South America.

ON THE ORIGIN OF THE LAND-SNAIL FAUNA OF QUEENSLAND, AUSTRALIA.[1]

BY CHARLES HEDLEY.

In a former article I dealt with the internal distribution of the mollusca of British New Guinea. A few remarks on the external relations of this fauna have since suggested themselves. Wallace's line, so conspicuous a severance among the vertebrates, appears to be quite blotted out when the distribution of animals is regarded from a molluscan standpoint. No sharp break occurs between the Malayan fauna as exemplified in Borneo or the Philippines and in New Guinea. All the characteristic Malayan forms, *Atopos*, *Xesta*, *Helicarion*, *Microcystina*, *Trochomorpha*, *Obba*, *Chloritis*, *Cochlostyla*, *Pupina* and *Diplommatina*, are common to both regions. The Solomon Islands, Fiji, Samoa, etc., appear by the light of the Papuan shells to be inhabited by an eastern extension of this Malayan fauna, which has also overflowered into Queensland.

One of the most remarkable facts yielded by an analysis of the Australian land molluscan fauna is that the operculate snails are confined to a narrow strip of land along the Queensland coast. Proceeding southward from Torres Straits, they diminish gradually till the last outpost of the invading army is reached about the Clarence River. The sole apparent exception to this rule is *Truncatella*, which spreads to Tasmania and South Australia; but as this genus is strictly littoral and evidently migrates not by land but by sea, it cannot be considered as a disturbing factor in my generalization. Contrasting the fauna of Queensland with the more typically Australian and probably archaic fauna of Tasmania, Victoria and Western Australia on the one side, and that of New Guinea on the other, it will be seen that this foreign aspect of the operculate genera *Pupina*, *Helicina* and *Diplommatina* is shared by the inoperculate

[1] From an article in Proc. Lin. Soc. N. S. Wales, Australia.

forms of *Atopos*, *Hadra*, *Chloritis* and *Papuina*; *Atopos prismaticus* of Papua claiming affinity with *A. australis* of Queensland; *Hadra broadbenti* with *H. fraseri*; *Chloritis chloritoides* with *C. porteri*; and *Papuina naso* with *P. macgillivrayi*. The species actually common to both regions are few; *B. macleayi* inhabits both countries, *T. annula* only finds a place in the Queensland catalogue by courtesy, while *Papa pedicula*, *S. gracilis*, *T. ceylonica*, *T. valida*, and *Leptopoma vitreum* are widespread throughout Polynesia. From these premises it may be deduced that the Queensland mollusk fauna, though isolated sufficiently long to have lost specific identity with that of Papua, has nevertheless been derived from it.

The shallow sea of Torres Straits now severs this continent from the adjoining island. Were its bed raised but seven fathoms, the two countries would be united, while an elevation of ten fathoms would form a wide bridge between them. When the marine life east and west of Torres Straits is better known, it will be of interest to observe whether the influence of an ancient isthmus is still visible in any divergence between the fauna inhabiting the two areas.

Further to the westward, the coasts of Australia and New Guinea again converge, being separated by an arm of the Arafura Sea, which gradually shoals from a central depth of 40 fathoms and stretches for about 150 miles between Cape Wessel in the northern territory and Cape Valsche on the opposite shore of Dutch New Guinea.

In the Transactions of the Royal Society of S. Australia, Vol. v., pp. 47–56, Professor Tate enumerates the land and fresh-water mollusca of tropical S. Australia [North-central Australia] it is remarkable that whereas a third of the landshells of Papua and a sixth of the landshells of Queensland are operculate, his census includes no operculate landshells whatever. Thus at the remote date when the ancestors of the present Queensland mollusk fauna migrated from New Guinea across the ancient isthmus that I suppose to have bridged Torres Straits, the Arafura Sea appears to have still presented an impassible barrier between the two countries. The former elevation of land in this region, if uniform from east to west, may therefore be calculated at more than seven and less than forty fathoms.

HELICES COLONIZED IN HERKIMER CO., N. Y.

BY WILLIAM B. MARSHALL.

Mr. Albert Bailey recently sent me specimens of *Helix elevata*, *Helix Mitchelliana*, *Helix profunda* and *Helix exoleta* from localities in Herkimer Co., N. Y. The following notes bearing upon the occurrence of these species in Herkimer county are extracted from a letter received from Mr. Bailey:—

"I think it will be necessary for me to explain the presence of certain Helices in Herkimer Co., N. Y. Several years ago (about 20) Dr. James Lewis, of Mohawk, colonized several species from Ohio in a branch of the ravine leading from Ilion to Cedarville. The specimens sent you are the offspring of the imported species. Of *Mesodon exoleta* Binn., I have collected many specimens—in fact they have become numerous. *Mesodon Mitchelliana* is also quite plentiful. Of *Mesodon elevata* I have found only nine specimens. Of *Mesodon profunda* I have six perfect specimens and some immature. Of *Mesodon multilineata* I have not succeeded in finding any. I have had the good fortune to find one reversed or left handed *Mesodon exoleta*."

NOTES ON UNIO CORUSCUS GOULD.

BY BERLIN H. WRIGHT.

In the Proc. of the National Museum, Vol. xv., page 419, Mr. Chas. T. Simpson, of the Smithsonian Institution, makes some notes on this species and others which he considers identical with it. He classes my beautifully rayed chestnut *U. fryanus* with the rayless, pitchy-black species, which Dr. Gould described in Proc. Bost. Soc. Nat. Hist., 1856, p. 15, as *U. coruscus*. The description says "*epidermide piceo*," or tar-like, "*solida*," or solid, "*transverse ovata ad dorsum lata*," or transversely ovate and broad behind. The habitat is given as the "St. John's River, near Beresford, Florida." The author remarks that it might be taken for a young *U. buckleyi* Lea, but is more *solid*, less angular and *darker colored*, *stronger hinge*.

I have tried hard to find out just what shell Dr. Gould described, have compared shells with the original type and have collected over every foot of ground in the vicinity of Lake Beresford, where the types were found. The original is a *wedge-shaped*, pitchy-black, rayless and *very* solid shell and in but one particular, resembles my *handsomely rayed, oval, thinnish* shell, with a *light* chestnut epidermis. The single point of resemblance is the *nacre*, which in both is brilliantly copper colored and iridescent. The type shell at Albany is truncated anteriorly, and *very* abruptly so, according to my figures which are most faithful representations of the different views of Dr. Gould's type specimen, and the dorsal margin is much more strongly arched than in any of my *U. fryanus*. I will add that my shell was not described from a small representation, but I have fully a half bushel as near alike as two pins; and I will add further that no man can find my shell in Lake Beresford or in that vicinity. Neither can it be said that they have become extinct there as no vestige of them occurs on Hontoon Island, at the entrance to Lake Beresford, where there is a perpendicular cut or enbankment, fully fifteen feet high, through a mass of Unios.

True it is that *U. fryanus* can be connected by intermediate forms with *U. coruscus* Gd. So also I can just as perfectly connect Mr. Simpson's *U. subluridus*, which he has just described from Florida, with any one of a half dozen Florida species.

SLUGS INJURING COFFEE.

BY T. D. A. COCKERELL.

Mr. Walter W. Wynne, of Brokenhurst, Mandeville, Jamaica, sends me some slugs which injure his coffee trees, together with the following interesting notes: "I first noticed this pest in 1888; it was brought to my notice by seeing numbers of brown leaves on the trees, all at the ends of the primaries. I was very much afraid the leaf disease had come here; however, on examination I found the new growth was, in every case, barked, and after some search found it was done by the slug. Since the discovery I have hardly left off my 'picking gang,' which turns over the rocks and stones, dead tree-trunks, etc., where the beasts lurk in daytime; I have also put heaps of lime at the tree roots, which helps to keep them away

and at the same time does the trees good. On the whole, though, I think the best plan is to plant bananas or plantains, which I am doing, as they are the especially favorite food of the slug, and by carefully searching the bananas, etc., great numbers can be found. The people remember a plague of these slugs some twenty years ago."

Mr. Wynne has gone into the question of remedies so carefully that there is little to add from the practical standpoint. It would probably be a good plan to encircle the trees, near the ground, with a thick ring of some obnoxious substance, such as coal tar or cart-grease. This could be done quite cheaply, and the slugs would be prevented from ascending the trees.

These slugs belong to a species called *Veronicella sloanii*. They were first noticed by Sir Hans Sloane, and afterward named *sloanii* by Cuvier. I have seen a specimen, collected by Sloane, preserved in the British Museum. The typical form is white or whitish, but Mr. Wynne's specimens constitute a variety, which may be called *Veronicella sloanii* var. *coffeæ*. This variety is over three inches long when adult, and about an inch and a quarter broad. Above it is dark brown, obscurely mottled with darker, but beneath white, more or less tinged with yellow. The foot or sole on which it walks is very much narrower than the body.

Institute of Jamaica, Jany. 26th, 1893.

NOTES ON THE HELICES OF THE BIOLOGIA CENTRALI AMERICANA.

BY H. A. PILSBRY.

[*Continued from p.* 117.]

The new section, *Praticolella*, is proposed by von Martens to replace *Praticola* Str. & Pfir., preoccupied. *H. griseola* and *H. berlandieriana* are united and both are well figured. The use of the subgeneric name *Lysinoë* for the *Aglaia* and *Odontura* of previous authors, is a needed reform and was adopted some years ago by the writer. The Mexican species of *Arionta*, described a year ago by R. E. C. Stearns, is not included.

In his rehabilitation of the subgenus Oxychona, Dr. v. Martens neglects to state that he follows the arrangement originated by the writer three years ago, and discussed at length in the *Manual of Conchology* (2), V, p. 128.

Oddly enough, v. Martens says that "perhaps also the Brazilian *H. bifasciata* and *H. lonchostoma* may find their natural place in this subgenus." The "perhaps" might well have been omitted in view of the fact that *H. bifasciata* is the type of the group! The curious *H. sigmoides* of Morelet is placed with doubt in SOLAROPSIS.

The genus POLYGYRA is adopted in the sense in which it is understood by myself and later American writers. Two new species of *Polygyra* are described and figured.

Of the genus STROBILA an interesting form, *S. salvini* Tristr., is described and figured. It is from N. Guatemala and resembles our *S. labyrinthica*, but the umbilicus is much wider.

The part concludes with the genus LABYRINTHUS. This group will prove to be a subgenus or section only of the genus *Caracolus*, as defined by me in 1889. The anatomical characters of *Caracolus* and its sections, *Lucerna*, *Dentellaria*, etc., have been discussed in the Proc. Acad. N. S. Phila., during the past year.

NOTES UPON DR. v. IHERING'S OBSERVATIONS.

BY H. A. PILSBRY.

The paper upon New Zealand Helices by our distinguished South American correspondent calls to mind a few thoughts which may be of interest to those who have read the previous articles.

It may be stated here, although the matter of no consequence, that my two articles upon this subject were published respectively two and one month prior to the issue of the *zweiter Theil* of v. Ihering's paper[1] (the portion containing his remarks upon New Zealand forms), although there is no doubt that the latter was written before mine, in fact during 1891. Our essential agreement upon certain points is a great satisfaction to me because it is a strong recommendation of the truth of those views. Especially is this the case in the estimation made by each of us of the systematic value of the mucous pore in *Zonitidæ*, and in the reliance upon characters of the generative system for the foundation of generic groups of Pulmonates. In regard to the mucous pore the writer wrote emphatically some years ago, that it could not be a family character, and in some cases is not even generic. Should we make a new "family"

[1] Zeitschr. f. Wiss. Zool., 54, drittes Heft. Ausgegeben den 4, October, 1892. Received at Philadelphia, Oct. 25, 1892.

for *Pœcilozonites*, which has the dentition, radula, etc., of *Zonites*, but *no mucous pore?* Or for *Streptostyla ligulata* because it has a tail-pore while some of the other *Streptostylas* with very similar shell and anatomy have none?

Passing over Dr. v. Ihering's limitation of the family *Helicidæ*, which I can readily prove to be untenable, I may be excused for making some mention of the new genus *Neohelix*. Several years ago, when I recognized the essential identity of *Polygyra*, *Triodopsis*, *Mesodon*, etc., I selected the first of these as a generic name for the whole, because it was the *oldest* name proposed. In common with the vast majority of modern naturalists, I recognize the *rule of* PRIORITY as absolute. Were it otherwise I could change Dr. v. Ihering's *Neohelix* to "*Paleohelix*" on the ground that he includes *H. townsendiana* Lea in it, that species being really a *Lysinoe*![1] Or on the ground that *Neohelix* is a misnomer, for they are not "new" helices at all, but a much older, more archaic type than the genuine *Helix* of Europe! The latter, indeed, are the *new* Helix, being the most highly specialized of all Helices.

As to v. Ihering's group "*Parahelix*," formed to include "all Helices not *Helicidæ* or *Neohelix*," it seems to me to be an entirely unnecessary addition to nomenclature; for it would include forms in no way related to one another. The anatomy may be unknown to Dr. v. Ihering, but, as may be seen by glancing over my paper on the genera of Helices, it is not unknown to some others. It is as if one were to propose a "family" to include *all carnivora* not belonging to *Felidæ* or *Canidæ*.

In respect to the former wide range of *Partula*, it should be said that Oppenheim's "*Partula*" are *Buliminus*, and Heilprin's are *Bulimulus;* both groups exist in the same regions to-day. A word on the former connection of New Zealand and South America. The only elements the two faunas have in common seem to be either (1) cosmopolitan genera, all of which probably date back to the Carboniferous period, or (2) genera of like ancient origin, but which have been replaced in the Tropics and the North by the more modern types developed by the more active competition. At the same time, I offer this simply as an *opinion*, which may stand or fall. In any case, the hypothesis of Prof. Hutton and Dr. von Ihering is of great interest, and cannot fail to stimulate investigation of this most important question.

[1] v. Ihering probably meant *H. ptychophora* Brown, a *Mesodon* formerly confused with the other species.

G. W. LICHTENTHALER.

To-day the news has reached me from California, of the death in San Francisco, February 20th, of GEORGE W. LICHTENTHALER, late of Bloomington, Ill. He was an enthusiastic conchologist, and his name is well known among lovers of shells, throughout the country. Deeply interested from the start in the success of the American Association of Conchologists, he contributed largely to its special American collection. Many of the labels in that collection, especially of West Coast shells, bear his name. But not alone in public was his generosity shown. Many of our younger conchologists can testify to the practical help received from him in the early stages of their study. He was a quiet, unassuming man, and it is fitting that we should express in words the sense of loss which we all feel.

I first met him in 1878 on the Pacific Coast, where he spent the winter for many years accompanied by his wife, travelling from San Diego to Puget Sound, in search of the forms of marine life which were their special objects of study. His wife died not many years after the period of which I speak, deeply mourned, and since then he has travelled alone. I last saw him in Oakland about a year ago.— *Wm. J. Raymond.*

NOTES AND NOTICES.

ANNOUNCEMENT.—Conrad's "Fossil Shells of the Tertiary Formations of North America" will be republished as soon as 100 subscriptions can be obtained at $3.00 each. The republication will consist of No's 1, 2, 3 and 4, of the original edition, 1832–33, and the so-called reprint of No. 3, 1835. The various changes made in the text of each of these parts in different editions will be given in full. Those desiring copies of this work should confer at once with Mr. G. D. Harris, Smithsonian Institution, Washington, D. C.

The Wagner Free Institute of Science will doubtless republish Conrad's "Medial Tertiary" under somewhat similar conditions.

HELIX NEMORALIS IN WISCONSIN.—While in Baraboo, Sauk Co., Wis., last fall, a little boy gave me a handful of *Helix* shells, that he said he picked up in the summer, while his father was plowing. They were all dead excepting one, which seemed to be of a different species and new to me. Through the kindness of Mr. Bryant Walker, I found the shell to be of the European species, *Helix nemoralis* Müller. It was so late in the fall I could not go out and

look for more specimens, but hope to be able to do so in the spring. If I succeed in finding more will report it, believing that some of the readers of the NAUTILUS would be interested in the find, from this locality.—*Nettie A. Rowley, Evansville, Wis.*

CANTHARIDUS IRIS Martyn.—It is not generally known, we believe, that the young of this handsome New Zealand shell is umbilicated; but a specimen 18 mill. in length in the collection of Mr. Shelley G. Crump shows this to be the case. The umbilicus is narrow and like that of an *Eutrochus*. The shell is evidently quite normal, and would serve quite well for a "new species" of *Eutrochus*, the periphery being sharper than in adult *C. iris*. Under a lens the surface of this specimen, as well as of some others in the Philadelphia Academy collection, is seen to be finely *pitted*, as if eroded by an *Eschara*. We say *as if*, for no trace of foreign growth is visible on the shell. It would be interesting to know the cause of this sculpturing.—*H. A. P. & C. W. J.*

DR. WM. H. DALL'S second volume upon the tertiary mollusca of Florida, etc. has appeared. A full notice of the numerous important additions to our knowledge of this fauna contained therein will be given next month.

An interesting paper read by Mr. Joseph Willcox before the Delaware County Institute of Science, entitled "ON THE EVOLUTION OF THE EARTH AND THE HEAVENLY BODIES," has been published in pamphlet form. The course of cosmic and terrestrial evolution is graphically described in the light of the latest researches; it would be difficult to find elsewhere the same amount of reliable information presented in such compact and readable form.

EXCHANGES.

WANTED.—Fossils, especially *Trilobites*, also *Murex* and *Zonites*, any locality, and shells not in my collection. Offered—British Land and Fresh Water and U. S. Land and Fresh Water shells.—*Robert Walton, Houghton St., Roxborough, Phila., Pa.*

MARINE, Land and Fresh Water shells, fossils, minerals, to exchange for marine shells or reliable works on marine mollusca.—*Homer Squyer, Mingusville, Montana.*

WANTED.—*Unios* and other fresh water and land shells, in exchange for those of southern Wisconsin. Please send list and receive mine.—*Nettie A. Rowley, Evansville, Wis.*

APR 10 1893

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THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
H. A. Pilsbry, Conservator Conchological Section, Academy of Natural Sciences, Philadelphia.

ASSOCIATE EDITOR:
C. W. Johnson, Acting Curator Wagner Institute of Science.

Vol. VI. APRIL, 1893. No. 12.

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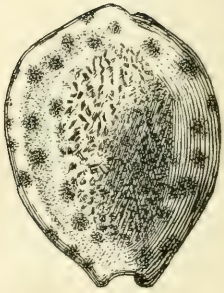

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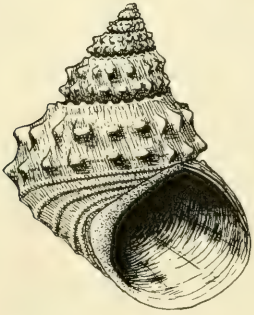

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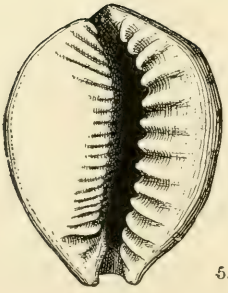

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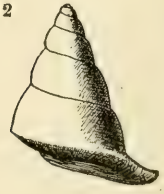


THE NAUTILUS.

VOL. VI. APRIL, 1893. No. 12

ILLUSTRATIONS OF NEW SPECIES OF SHELLS.

NOTE.—In the December, January and February numbers, plate II is referred to erroneously as pl. I. All the figures of this plate are slightly magnified, being one and one-third times natural size.

Nanina (Ariophanta) Dohertyi Aldrich. Pl. II, figs. 1, 2.

This species was described in the December no., p. 90.

Bathybembyx Crumpii Pilsbry. Pl. II, fig. 3.

This species was described in the January no., p. 105, as *Calliostoma Crumpii*. In the last number of the "Journal de Conchyliologie" (Paris), Mr. Crosse proposes the name *Bathybembyx* to replace Watson's genus *Bembyx* (preoccupied). In it he places *B. œola* Watson, *B. argenteonites* Lischke, and also, with doubt, *B. alwinæ* Lischke. The last species should, I believe, be left in *Calliostoma*. The others form a natural group of very beautiful shells, characteristic of the Japanese fauna. These shells are closely allied to *Solariella*, but larger and imperforate. They seem very nearly related to Dall's subgenus *Turcicula*, differing only in the very thin (or lacking) epidermis. The species here figured is perhaps the most beautiful of the three now referred to *Bathybembyx*.

Cypræa cruenta var. **Greegori** Ford. Pl. II, figs. 4, 5.

Described on p. 112, February, 1893.

A NEW ANODONTA.

BY CHAS. T. SIMPSON.

Anodonta mearnsiana.

Shell rhomboid, compressed anteriorly, inflated posteriorly, generally smooth and shining, covered with rather sulcate growth lines, moderately solid in structure, having a thin epidermis, which is easily worn off, and varying from yellowish to olive-green in color; beaks sculptured with some half dozen undulations, which are acute posteriorly, and rounded anteriorly. The female shell exhibits a considerable degree of inflation extending from some distance back of the beaks to the posterior-ventral region, and with the male shell occasionally shows a couple of slight sulcations running from the umbones along the dorsal slope.

The upper part of the anterior curve is rather more prominent than the lower; the ventral region is sometimes slightly emarginate in the center of the females; and there are occasional slight traces of biangulation posteriorly in the shells of both sexes. Nacre a soft silvery color, inclining to a lurid brownish in the quite shallow cavity of the beaks; and near the rather straight hinge line; the brown patch or scar at the end of the nearly concealed ligament rather elongated; cicatrices rather distinct.

Mantle large, thin, not heavily bordered, brownish in the region of the fringes and anal opening, whitish elsewhere; fringes few, fleshy, and rather pointed. Branchiæ moderate, the inner slightly larger, and darker than the outer; branchial opening large, furnished with a few rather short, fleshy papillæ. Palpi elongated, pointed at the posterior, united for three-fourths of their length. Foot solid, rugose. Anal opening large, not furnished with papillæ; super-anal opening small, removed to some distance above the anal opening.

Length from anterior to posterior ends 85, breadth 45 mm.; diameter 25 mm. San Bernandino Ranch, Mexican Boundary Line, Arizona.

A large number of shells and a few specimens preserved in alcohol were sent some time ago to the U. S. National Museum by Messrs Mearns and Holzner of the International Boundary Commission. Externally the shell closely resembles certain forms of *Unio complanatus*, but it is in general a smoother species, and has a more delicate texture. Much as it differs from the ordinary *Anodonta*

angulata I believe that species to be its nearest ally; the two forming a group peculiar to the Pacific drainage of the United States, and quite distinct from *Anodonta wahlametensis, californiensis, nuttalli, oregonensis, kennerlyi,* and *youkonensis,* which undoubtedly group with *Anodonta cygnea,* and which may have descended from that protean species, and reached North America by way of a former land passage in the neighborhood of Bering Strait. A dorsal view reveals a striking resemblance between the present species and *Anodonta angulata;* both have the area of greatest inflation about one-third the length of the shell from the posterior point, from which they gradually narrow to near the anterior end, where they become more rapidly compressed to the point, the beak sculpture is similar; the general outline of the shells is much alike, and there is quite a strong resemblance in the texture and the nacre. *Anodonta angulata* in the Museum collection (Mus. no. 104,165) from Northern Calfornia, shows a remarkable fading out of the peculiar keel common to that species, and another specimen (no. 104,166) from Los Angeles shows still less of this character, and in a photograph taken by Mr. Hemphill from a specimen in his collection it is wanting altogether, while the two sulcations on the posterior slope show quite plainly.

At the same time, the species under consideration differs sufficiently from *Anodonta angulata* in texture, and the form of the inflation of the posterior region in the female to separate it at once specifically from that form.[1] This new species will be figured when the large amount of land and fresh-water material from the western United States collected by the Biological Survey of the Agricultural Department is worked out, and the results published.

THE SHELL-BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.[2]

Aplexa sp. A small species about the size of Lea's *Physa hordacea* and apparently related to it, was found in a small lake lying between Torch Lake and Grand Traverse Bay in Antrim County.

---

[1] So far as I know no description of the soft parts of *Anodonta angulata* has ever been published.

[2] The following portion of Mr. Walker's paper should have appeared in the August NAUTILUS.

It is quite different from any other species found in the State, but in present chaotic condition of the synonymy of this genus it does not seem advisable to run any risk of duplicating some previous description.

Planorbis lentus Say. Cited by Miles, who probably had a large form of trivolvis before him.

P. trivolvis Say. Abundant everywhere. *P. corpulentus* Say and *regularis* Lea usually referred to this species are cited as distinct by DeCamp. The latter is doubtfully cited by Currier.

Specimens exhibiting the distorted appearance caused by a change of plane in the growth of the whorls as described by Ingersoll in his *P. plexata* occur not infrequently in some localities.

P. truncatus Miles. This peculiar and well marked form appears to be confined to Michigan. Described originally from specimens collected from Saginaw Bay, it seems to have escaped further notice until 1887, when it was discovered in the Elk river, Antrim County. These specimens are quite typical and not only confirm the validity of the species, but extend its range across the entire northern part of the State.

P. bicarinatus Say. Common everywhere.

P. bicarinatus corrugatus Currier. Perch Lake, Kent County. A well marked form characterized by its costate surface. Specimens from Long Lake, Grand Traverse County, exhibit the same tendency but not to the extent shown by the shells from the original locality.

P. bicarinatus major. Specimens from Crystal Lake, Benzie County, from their perfection and size are worthy of being separately noticed. They are larger, pinkish-white in color, with the carinæ on both surfaces elevated into a keel which is white. The superior carina extends to the lip and modifies the shape of the aperture, which is a more or less expanded and darker in color within. The outer lip is somewhat thickened and white.

P. multivolvis Case. The rediscovery of this long lost species by Dr. M. L. Leach, in Marl Lake, Roscommon County, has been recorded in the Journal of Conchology, V, p. 330. The hump on the last whorl opposite the aperture as figured in Land and Fresh-Water Shells pt. II, fig. 186, is not a characteristic of the normal shell, as but a small percentage of several hundred specimens exhibit any tendency toward it. When it does occur, it bears the appearance of being an abnormal extension of the last whorl being

more or less irregular in form, and usually deflected from the plane of the rest of the whorls.

P. campanulatus Say. Common everywhere. An occasional specimen has a hump on the last whorl opposite the aperture as described by Case in *P. multivolvis.*

P. campanulatus minor Currier. Distinguished only by its smaller size. Perch Lake, Kent County.

P. albus Mull. Commonly distributed over the State.

P. exacutus Say. This species which is found in all parts of the State, varies considerably in size and color.

P. deflectus Say. While not a common species, it undoubtedly ranges over the whole State.

P. parvus Say. Common everywhere and varies considerably under local influences.

P. costatus DeTar and Beecher. A minute costate form said to be from the neighborhood of Ann Arbor. I know nothing of it.

Segmentina armigera Say. Common everywhere.

S. wheatleyi Lea. (?) Found in great abundance several years in the suburbs of Detroit. Has not been noticed elsewhere in the State. This form if not Lea's *Wheatleyi* is easily separated from the typical *S. armigera* by its thickened lip, which decidedly contracts the aperture.

Ancylus fuscus Ad. Although cited in all the catalogues from that of Miles down, this species does not seem very common. Belle Isle, in the Detroit river is the only locality where I have found it.

A. rivularis Say. Cited by DeCamp.

A. parallelus Hald. Northern part of the State.

A. diaphanus Hald. River Rouge, Wayne County. Also cited by DeCamp.

A. tardus Say. The most common species we have, judging from my own experience.

Valvata tricarinata Say. Common everywhere. The forms *bicarinata* Lea, *unicarinata* DeKay and *simplex* Gld. are cited as distinct by DeCamp.

V. sincera Say. Very abundant in favorable localities all over the state. The form known as *striata* Lewis, or *Lewisi* Currier, distinguished by its coarser striæ and larger size, is cited as distinct by

Currier and DeCamp; the latter, however, now considers it a strongly marked form of *V. sincera*. *V. humeralis* as cited by Miles, is undoubtedly a form of this species.

Lyogyrus pupoidea Gld. Cited by DeCamp.

Vivipara contectoides W. G. Binney. The only reference to the occurrence of this species in Michigan, that I know of, is that made by Binney (Land and Fresh-Water shells II, p. 24). It does not appear to have been found by any of our local collectors and must be considered a very doubtful member of our fauna.

Campeloma ponderosa Say. Cited by Sager, Miles and Currier, but does not appear in any of the later lists and must be considered a doubtful species in Michigan. "I have never seen it from this state as I found it in Alabama. It is not a northern species." W. H. DeCamp.

C. decisa Say. Common and variable. Sinistral specimens are cited by DeCamp as var. *heterostropha* DeKay.

C. decisa flava Currier Mss. Specimens from Long Lake, Grand Traverse County are so named by Mr. Pilsbry. A very beautiful form of this common species.

C. decisa melanostoma Currier Mss. A small form from Grattan, Michigan, was sent to me under this name by Mr. Streng.

C. integra Say. Common everywhere.

C. rufa Hald. Generally distributed over the State, but not as common as *C. integra* and *decisa*.

C. gibba Currier. I know nothing of this form beyond the description by Currier and Dr. Jas. Lewis' critical remarks thereon in the American Journal of Conchology (III, p. 112 and IV, p. 81.)

C. Milesii Lea. Originally described from Antrim County. The reference of specimens from the Detroit river to this form has been approved by Mr. Pilsbry.

C. obesa Lewis. Quite common throughout the State and frequently of large size.

C. subsolida Anth. Cited by DeCamp. Specimens from the Boardman river, Grand Traverse County, identified as this specimen by Prof. R. E. Call are referred to *decisa* by Tryon and Pilsbry.

Lioplax subcarinata Say. Dr. Leach informs me that a single specimen from Higgins Lake, Roscommon County, was referred to this species by Mr. Tryon.

Bythinia tentaculata L. The recent discovery of this species at Holland, Michigan, by Dr. DeCamp was noticed in the NAUTILUS for October, 1891. I am indebted to him for specimens.

Somatogyrus isogonus Say. Cited by Miles and Currier. Stimpson's anatomical studies of this species for his "Researches upon the Hydrobiinæ" were made from Michigan specimens. (Loc. cit., p. 22). DeCamp cited it in his catalogue on Currier's authority but writes: "I do not believe that it exists in this State. Have for many years examined the ground where Currier said he found the specimens sent Stimpson, but have never found anything but young of *Campeloma decisa*."

Amnicola porata Say. Common all over the State. *A. pallida* Hald. and *limosa* Say, which are cited in different lists as distinct, are now I believe generally considered forms of this species.

A. cincinnatiensis Anth. Not as common as the preceding specimens, but ranges over the whole State.

A. decisa Hald. Cited by DeCamp.

A. grana Say. Common in the southern part of the State.

A. lustrica Pils. Common and somewhat variable. The late Dr. James Lewis, many years ago, characterized specimens from the Huron river at Ann Arbor as "largest I have ever seen."

Bythinella attenuata Hald. Cited by DeCamp, to whom I am indebted for specimens from Grand Rapids.

B. tenuipes Coup. Cited by DeCamp, who writes me: "I sent living specimens to Tryon and he sanctions their identity."

B. Binneyi Tryon. Cited by DeCamp.

B. Nicklinana Lea. Cited by DeCamp.

B. obtusa Lea. River Rouge, Wayne County. Also cited by DeCamp from Kent County.

Pomatiopsis lapidaria Say. Common in the southern part of the State.

P. cincinnatiensis Lea. Cited by Beecher in the list of Ann Arbor shells. I have received specimens from Petersburg, Monroe County collected by Mr. Jerome Trombly.

Pleurocera subulare Lea. Southern part of the State. Common.

P. subulare intensum Anth. Collected by Dr. Leach in Mono Lake, Muskegon. Cited also by DeCamp.

P. neglectum Anth. Cited by Miles and DeCamp. Mr. Streng has kindly sent me specimens from Grand River, Kent County.

P. elevatum Say. Grand River, Michigan, received from Mr. Streng.

P. labiatum Lea. Cited by DeCamp.

B. pallidum Lea. Cited by DeCamp.

Goniobasis livescens Mke. Very common and considerably subject to local variation.

G. livescens cuspidatus Anth. This form occurs abundantly in the Maple River, Clinton County, where it was collected by Dr. Leach. Cited by DeCamp from Kent County, and collected by Streng at Berlin, Ottawa County.

Goniobasis Milesii Lea. Huron River, Ann Arbor, Michigan. This form originally described from Tuscola County specimens, is probably a local variety of the preceding species.

G. translucens Anth. Grand River, Kent County, collected by DeCamp. It is doubtful whether this species is more than a banded variety of *G. livescens* Mke.

G. brevispira Anth. Collected at Mono Lake, Muskegon by Dr. DeCamp and identified by Pilsbry.

G. pulchella Anth. Cited by Miles and DeCamp.

G. gracilior Anth. Cited by DeCamp from Round Lake, Petosky, Michigan.

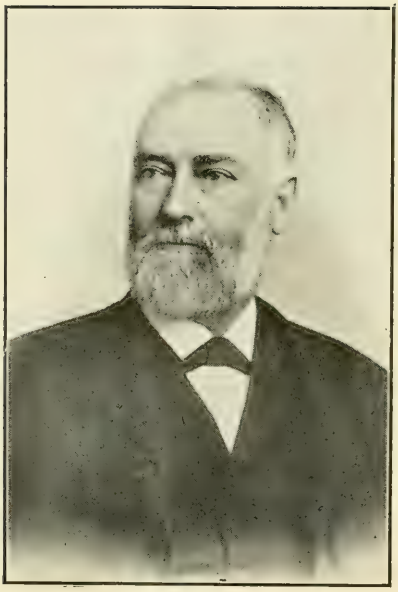
G. Niagarensis Lea. Cited by Miles.

G. Virginica Gml. Cited by Sager and Miles. Clearly an error as the species does not occur west of the Alleghanies. As *P. subulare* is not given in either of these lists, it seems probable that that is the species referred to.

Unio alatus Say. Southern part of the State. Muskegon is the most northern locality known to me. Specimens from the Detroit river are but half the size of those from the Rouge river, one of its tributaries in Wayne County. The same dwarfing effect of the colder water of the Detroit river is noticeable in nearly all of the species found there.

Addenda.

On page 66, line 14, for *S. partumeium* Prime, substitute *S. Jayanum* Prime, and add the following:



GEORGE W. LICHTENTHALER.

S. partumeium Say. Very abundant everywhere and quite variable.

GEORGE W. LICHTENTHALER.

BY MORTON J. ELROD, ILLINOIS WESLEYAN UNIVERSITY.

The familiar face of George W. Lichtenthaler, one of the best known of American conchologists, and one of the most earnest and energetic collectors of natural history specimens, will be seen no more. He passed away at San Francisco on Tuesday, February 20th., death being caused by fatty degeneration of the heart. He was 60 years of age.

Mr. Lichtenthaler was born in Pennsylvania, and came to Bloomington, Ill., at the age of twenty-two. For five years he was a drug clerk, then bought out the stock, conducted business for himself for seventeen years, after which he retired with a snug fortune. During this time he imbibed a taste for natural history, and after his retirement devoted his entire time and the proceeds of his large estate to the gathering and collecting of shells, ferns, and algæ. Mrs. Lichtenthaler died nine years ago, leaving no children. After her death Mr. Lichtenthaler turned his mind more than ever to his chosen work. His wife's death was a great blow to him, and he was no doubt greatly moved to collecting to forget his sorrow. His affection for her is shown in his desire that the vast collection should be given a name that would incorporate the name of "Rebecca S. Lichtenthaler."

Mr. Lichtenthaler was an amateur collector, never having sold specimens, or labored for hire. It was a labor of love. If he could not exchange he would give of his duplicates to those who would make use of them. Many people of this community treasure collections from distant climes given by him, and many a lad with a love for nature has had this love fanned into a flame through his encouragement, and has gone from the presence of this great-hearted man not only with a greater love for nature's works, but with a liberal gift of shells or other specimens carefully preserved. Many a case has he recounted to me, sitting by my fireside, of boys he has helped to knowledge and position, by pointing the way and lending substantial aid.

Had he desired, he might have been famous as a traveler, by putting his observations in print. But he disliked and shunned publicity, and we know of nothing he has written. He was one of those workers who cared little for making new genera or species, and who collected not wholly for himself, but also for his fellow workers, and for public museums. In his travels he has been in nearly every country in the world, has been several times along the entire west American coast, was at home in the Sandwich Islands, has traversed the coast of Europe from North Cape to Gibraltar, and has been up and down both coasts of Africa, as well as around the Indian Ocean. In these travels many of the rarest species known to science were brought together, and are left among his great collection.

He was one of the early members of the "American Association of Conchologists," being enrolled as a member, May 15th, 1890. His special study was shells of the Pacific Coast. He was an active and enthusiastic member, and did much toward its promotion. His gift of Pacific Coast shells to the collection of the Association was a large and valuable addition.

Few men have as wide a personal acquaintance with men of science as he had. Devoting all his energy and time to travel and collecting, and having been all over the American continent, he met them everywhere. His retiring disposition led him to make little mention of his achievements and his great work was not known to many of the people of his home. But to a few of his friends and acquaintance who could appreciate his work he unburdened his heart, and would recount his travels and experiences, and give descriptions of museums and countries for hours at a time. He was an interesting conversationalist, and would relate his experiences in a manner that always commanded attention.

His main work was in conchology. His collection embraces many highly polished specimens, and he spared no expense to have always the finest and best that was to be had. While on a trip to France a few years ago he heard of an English firm who cut gastropods longitudinally to show their spiral arrangement, and he has case after case of shells of this exquisite workmanship. All his specimens are authoritatively correct, having been labelled by the highest authorities, and we are glad to announce to the conchologists of the middle and western United States that he has left the collection where it will be accessible to the public for comparisons.

His collection embraces shells, crustaceans, echinoderms, corallines, corals, fossil shells and plants, minerals, ferns, and marine algæ. There are six to eight thousand species of shells, and at a low estimate twenty-five thousand specimens, from all parts of the world. There are eight hundred species of marine algæ, and four hundred species of ferns. The latter include a nearly complete collection of the ferns of North America, a complete collection from the Hawaiian Islands; also many from India, China, Japan, Australia, New Zealand, South America, Europe, etc. He stated that he had two species not in any other collection.

This vast and valuable collection he leaves without reserve to the Illinois Wesleyan University, in Bloomington, where his life has been spent, where his bride was wedded and laid to rest; and here his many friends will be permitted to again look through it, but without his guiding hand and eloquent description. This gives the Illinois Wesleyan University his life work, and endows it with one of the finest conchological collections in the West. It will be known as the "George W. and Rebecca S. Lichtenthaler Collection," and will enshrine their names not only in the hearts of their friends, but also in the hearts of many students who will receive inspiration from his work, as many have done from his life.

NOTES AND NOTICES.

Correction.—In the February No. the date of Mr. Martindale's death was by error given as Jan. 10, instead of Tuesday Jan. 3d.—*P. N.*

Prof. B. Shimek, of the State University of Iowa, is collecting invertebrates and cryptogamous plants in the interests of that institution in Nicaragua.

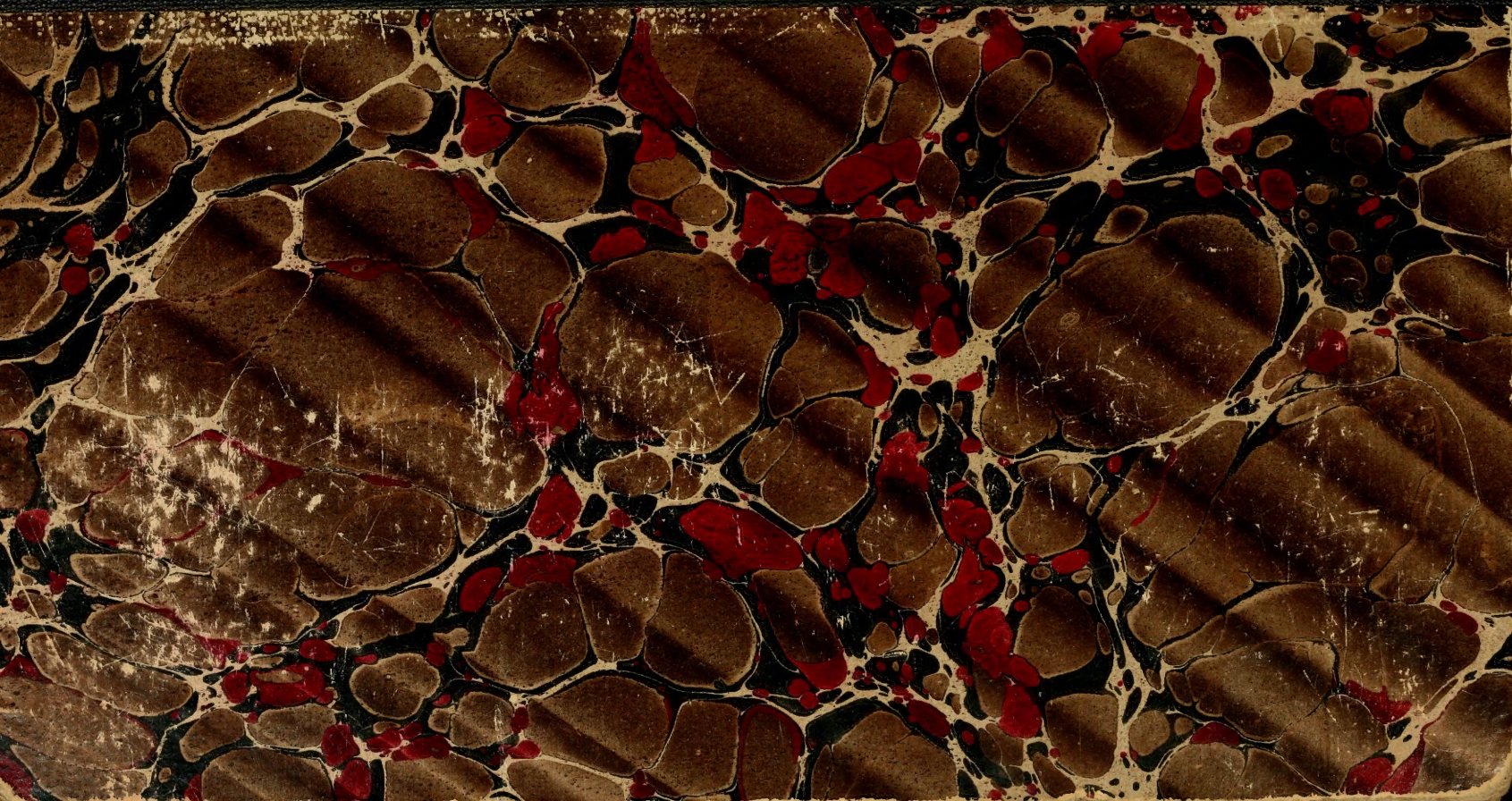
Conrad's Medial Tertiary.—The Wagner Free Institute of Science of Philadelphia, Pa. proposes to reprint the book on The Medial Tertiary Fossils of the United States by T. A. Conrad, if 150 subscriptions can be obtained at $3.50. For circular apply to the Institute.

Unio coruscus, subluridus, etc.—In looking over Mr. Berlin H. Wright's "Notes on *Unio coruscus* Gould," in the March Nautilus I see that he acknowledges that his *U. fryanus* can be con-

nected by intermediate forms with *U. coruscus;* and he states that he can as perfectly connect my *U. subluridus* with any one of a half dozen Florida species. Not long ago Mr. Wright sent me for inspection the shells he identified as *subluridus,* and I saw at once that he had made a total mistake as to the species ; *as these specimens were undoubted U. buckleyi,* quite inflated, somewhat keeled, and rather smooth, shining shells, and no more like my species than is *U. obesus.* Individuals of *Unio buckleyi, coruscus, lugubris, hazelhurstianus,* and other species of the *buckleyi* group vary from being absolutely smooth and rayed, a young or adult stage generally to dull colored, and even rough externally, a condition quite common in old specimens.—*Chas. T. Simpson.*

Collection of Shells for Sale.—We learn that the collection of Rev. A. Dean, numbering about 3500 species, is offered for sale, as Mr. Dean is about to remove from his home at Muncy, Pa. The American land shells are richly represented by a nearly complete series, including almost all of the rarer species. The west African and Sandwich Island forms are also well represented, as well as an unusually large proportion of interesting foreign marine shells.

We are in receipt of "The Microscopical Bulletin" published by Queen & Co., which contains a Bargain list or Clearance sale of microscopes, objectives, etc. Any one desiring these should send for the February Bulletin to Queen & Co., Chestnut St., Philadelphia.

Mr. B. B. Woodward has lately published (Ann. Mag. Nat. Hist. Feb., 1893) a classification of the *Pelecypoda*, in which the families of bivalves as given by Fischer are rearranged in accordance with Pelseneer's scheme founded on the morphology of the gills. The table of families is very useful as it gives the gist of Pelseneer's ideas at a glance. In his review of the various recent classifications Mr. Woodward does not mention that of Dall, being apparently ignorant of it. It is much to be regretted that those who set forth new classifications should not first acquaint themselves with the work of their predecessors.

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